UNIVERSITY
OF MICHIGAN
MAY 25 1954
ENGINEERING
LIBRARY

MAY [illegible], 1954
Vol. 146 — No. 20

MANAGEMENT • PLANT • TRAFFIC • COMMERCIAL • LEGAL • ACCOUNTING •

Telephony

THE JOURNAL OF THE TELEPHONE INDUSTRY

Published every week on Saturday by TELEPHONY PUBLISHING CORPORATION, 608 South Dearborn Street, Chicago 5, Illinois. Subscription $3.50 per year. Entered as second class matter at the Post Office at Chicago, Illinois, under the act of March 3, 1879.

Guaranteed Circulation This Issue
10,056 of Which 9,533 Is Paid

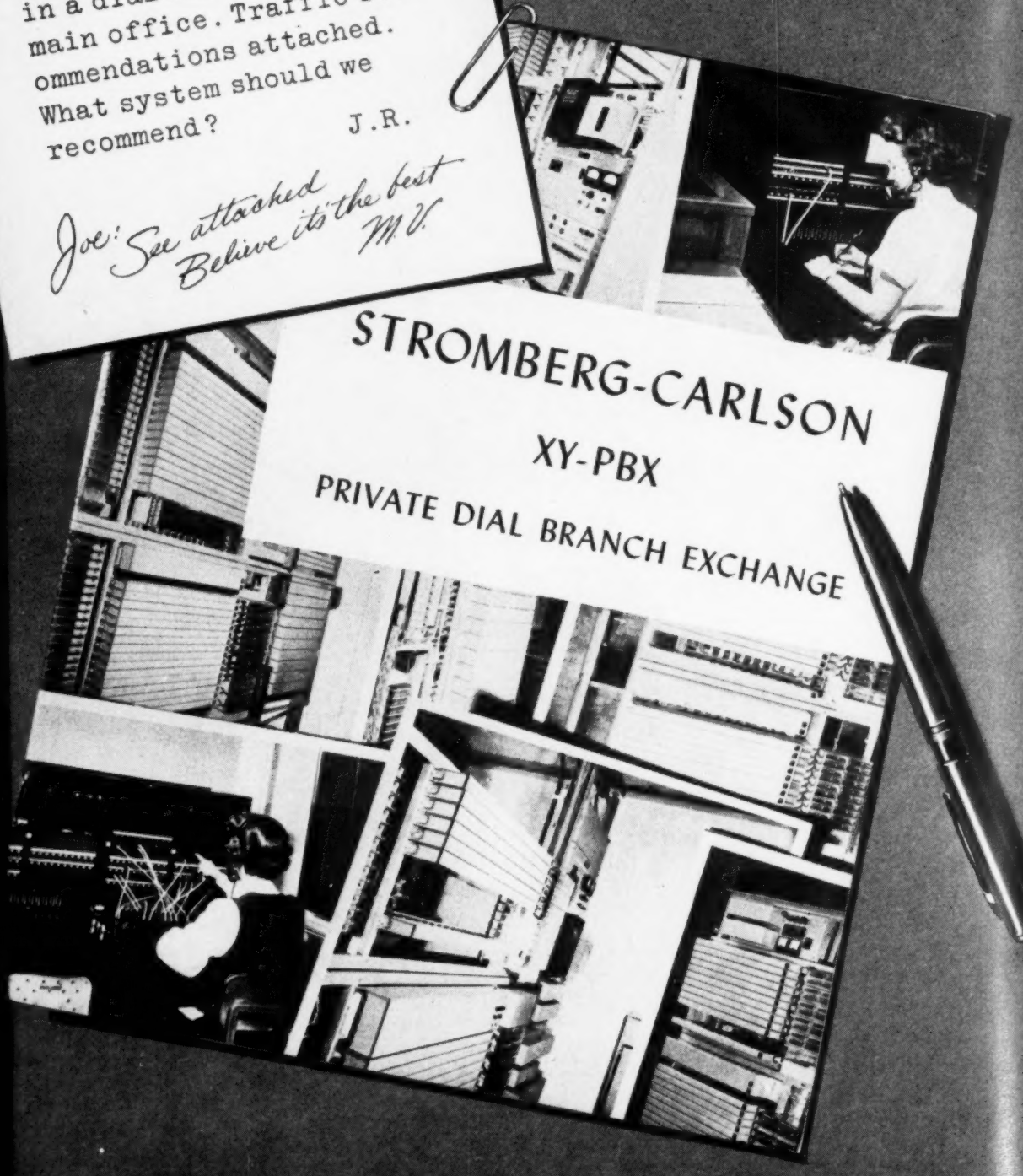
from

J.R. Commercial Manager

MEMO TO: M.V. Chief Engineer

Brown Mfg. is interested in a dial PBX for their main office. Traffic recommendations attached. What system should we recommend? J.R.

Joe: See attached Believe it's the best M.V.



STROMBERG-CARLSON

XY-PBX

PRIVATE DIAL BRANCH EXCHANGE

· ANSONIA ·

Ankoseal®

THE ALL-PLASTIC CABLE

Trouble Free

(A CASE HISTORY)

A telephone company in New York State installed Ankoseal telephone cable for a "temporary" purpose in 1949. After three and a half years of service with "no trouble whatever", it was removed, examined and found to be in excellent condition. So it is now being re-used at another location and the General Manager reports enthusiastically that he is looking forward to "many more years of trouble-free service".

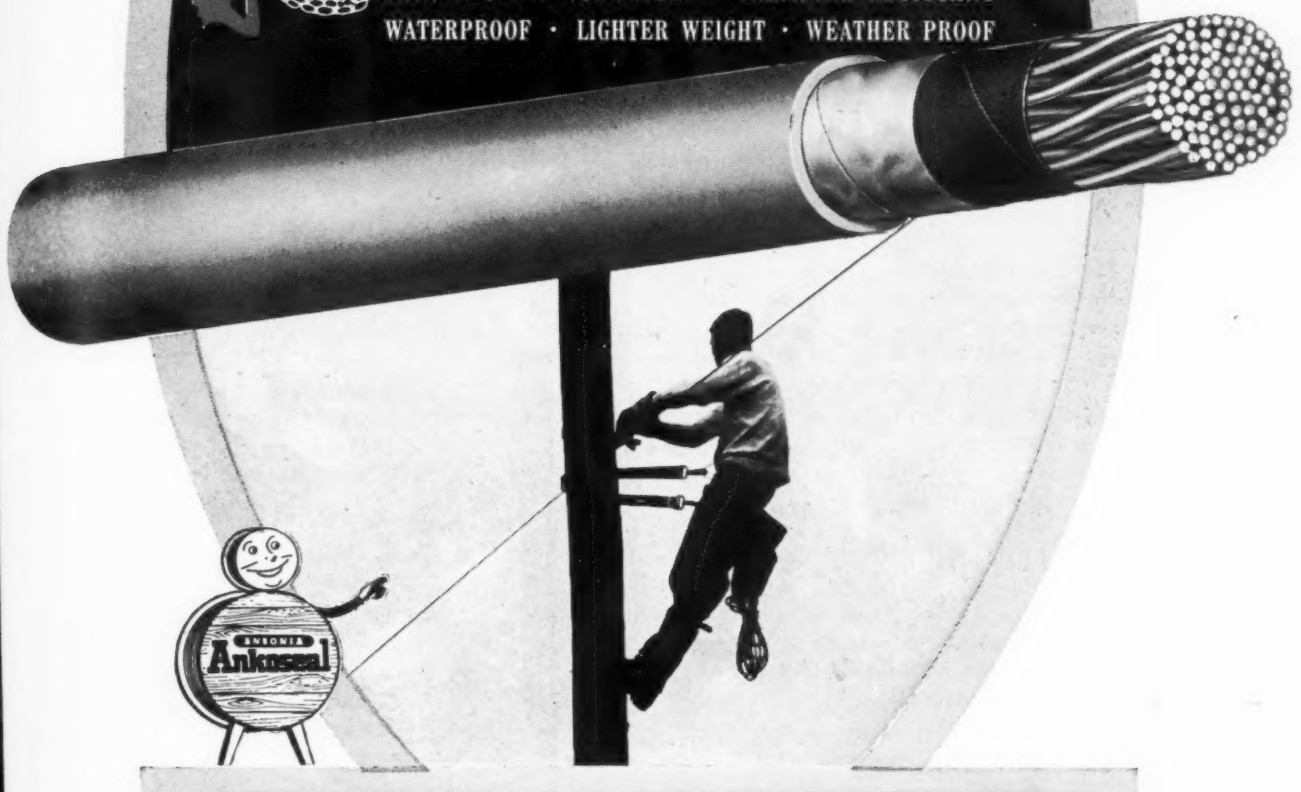
For experiences like this, specify Ankoseal for your next job.

*Letter on file at Ansonia

ANKOSEAL ALSO IS—

ELECTRICALLY SUPERIOR · CHEMICAL RESISTANT

WATERPROOF · LIGHTER WEIGHT · WEATHER PROOF



THE ANSONIA

WIRE & CABLE COMPANY

ANSONIA, CONNECTICUT

FLASHES AND PLUGS

THE DIRECTORY STORY. *The Saturday Evening Post* recently published the story behind the telephone book.

It reported that an astonishing number of people want to be listed first in the book and they will go to great lengths to achieve this distinction.

For instance, there was the man who claimed his last name was Aaron but spelled it with five "a's." Last place is less bitterly fought for.

However, the *Post* said, the biggest problem is accuracy. The telephone people claim their directories are 99.91 per cent correct. They spend months training the girls who take service orders to get names and addresses right. Thus, most of the errors are the fault of the careless subscribers.

• • •

INCIDENTAL SOUND EFFECTS. W. F. Cook, manager of the Peninsular Telephone Co.'s Lakeland, Fla., exchange recently sent us this story:

"About the time we changed to the national toll dialing system, one of our county judges placed a call to his daughter in a distant city.

"He noticed that the operator did not pass the call or speak to anyone before his daughter answered. Then he heard a voice in the background saying, 'Well, it worked'.

"It must have been the operator's first call on the network."

• • •

CONTROLLED TOLL. A well-known producer has the habit of telephoning his press agent at all hours of the night and from unexpected places throughout the world.

Recently the agent was awakened at 4 a.m. by a call from his employer. He said, "Do you want me to talk fast or slow?"

The producer replied, "What do you mean by 'fast or slow'?"

The agent answered, "Well, if you're in New York I'll talk slow . . . if you're in California, I'll talk fast."

"Talk medium," said the boss. "I'm in Chicago."

• • •

MESSAGE TO GARCIA. An operator tried to complete a lady's emergency call to a man whose telephone had been disconnected. She called the neighbors and had no luck. So she sent out a repairman to re-install the connection.

Still no one answered. The woman making the emergency call then said, "O, I forgot. He sleeps like the dead. He'll never hear it."

At which the operator brightly replied, "Well, if he doesn't answer by the time I get off duty, I'll go over and pound on the door."

CIRCULATION

Guaranteed circulation of this issue is 10,056, of which 9,533 is paid.

Telephony

THE JOURNAL OF THE TELEPHONE INDUSTRY

May 15, 1954

Contents

TELEPHONY'S THIRD MEDIUM 17
By G. D. Wallenstein

IN THE NATION'S CAPITAL 20
By Francis X. Welch

INDEPENDENTS' PART IN NATIONWIDE CUSTOMER TOLL DIALING 22
By L. L. Ruggles

THE PLANT MAN'S NOTEBOOK 25
By Ray Blain

THE OPERATOR'S CORNER 26
By Mayme Workman

REA APPROVES FIVE RURAL LOANS 27

COURTS AND COMMISSIONS 30

H. D. FARGO Jr., *President & Advertising Manager*
R. C. RENO, *Vice President & Editor*
H. D. FARGO, *Vice President & Treasurer*
A. J. STULTS, *Secretary & Western Manager*
DAN FARGO, *Managing Editor*
GEORGIA LEARNED, *Associate Editor*
RAY BLAIN, *Technical Editor*
FRANCIS X. WELCH, *Washington Editor*
MAYME WORKMAN, *Traffic Editor*
VIVIAN RYDEN, *Circulation Manager*

WESTERN REPRESENTATIVES:
McDonald-Thompson, San Francisco, Cal.
Also offices in Los Angeles; Seattle, Wash.; Houston, Tex., and Denver, Colo.

Published by
TELEPHONY PUBLISHING CORP.

Vol. 146, No. 20. Published every week on Saturday by TELEPHONY PUBLISHING CORPORATION, 608 South Dearborn St., Chicago (5), Ill. 20 cents per copy (except special issues). Subscription $3.50 per year U. S.; $4.50 Countries in U. S. Spanish Postal Zone; $4.50 Canada; $5.50 Other Countries.

608 S. Dearborn St., Chicago (5), Ill., U. S. A.
Telephone WA bash 2-2435

Telephony's Third Medium

By

*G. D. WALLENSTEIN**

COMPLETELY integrated toll networks are now being built around a judicious combination of three basic transmission facilities — open wire line, cable, and microwave. All three use carrier telephone equipment to obtain a maximum number of channels for each dollar of plant investment.

Although the application of carrier for multi-channel transmission on land lines is well appreciated by all telephone men, the history of microwave development, coupled with nationwide publicity given to transcontinental microwave systems in recent years, has tended to obscure two basic facts of particular importance to the Independent telephone industry.

First, microwave as a basic transmission medium is simply a further development of the application of radio in the telephone industry (radio circuits have been used commercially since 1920).

Second, a complete multi-channel microwave system is a natural extension of the present widely used land-line carrier systems. Microwave systems can be just as practical for transmission of a few channels over a short distance as they are for transmitting hundreds of channels across the country.

Microwave equipment specifically designed for use in the conventional telephone plant is now available, with installation and maintenance techniques conforming to standard telephone practices. Using such equipment, groups of single-sideband carrier channels can be interconnected with wire line and cable facilities to form an all-carrier toll network comprised of all three basic types of transmission equipment.

In carrier-current toll networks, the wire, cable and wireless facilities may be looked upon as highways designed for heavy traffic of many simultaneous messages.

An evaluation of key factors limiting the usefulness of these highways shows microwave links economically advantageous and compatible in quality with land-line facilities.

From Radio to Microwave

The use of point-to-point radio for commercial telephone circuits in the United States began in 1920 with the inauguration of regular service to Santa Catalina island, 30 miles off the coast of California. With further developments in radio techniques, a number of point-to-point circuits were installed, particularly in areas inaccessible by land-line techniques. Noteworthy among these applications are the many radio toll circuits operated by the Northwest Telephone Co. of British Columbia and the Hawaiian Telephone Co.

Before the advent of microwave, problems of cost and unavailability of frequency spectrum prevented direct competition between radio and land lines for all types of toll routes. This

*Mr. Wallenstein is chief applications engineer of Lenkurt Electric Co., San Carlos, Cal.

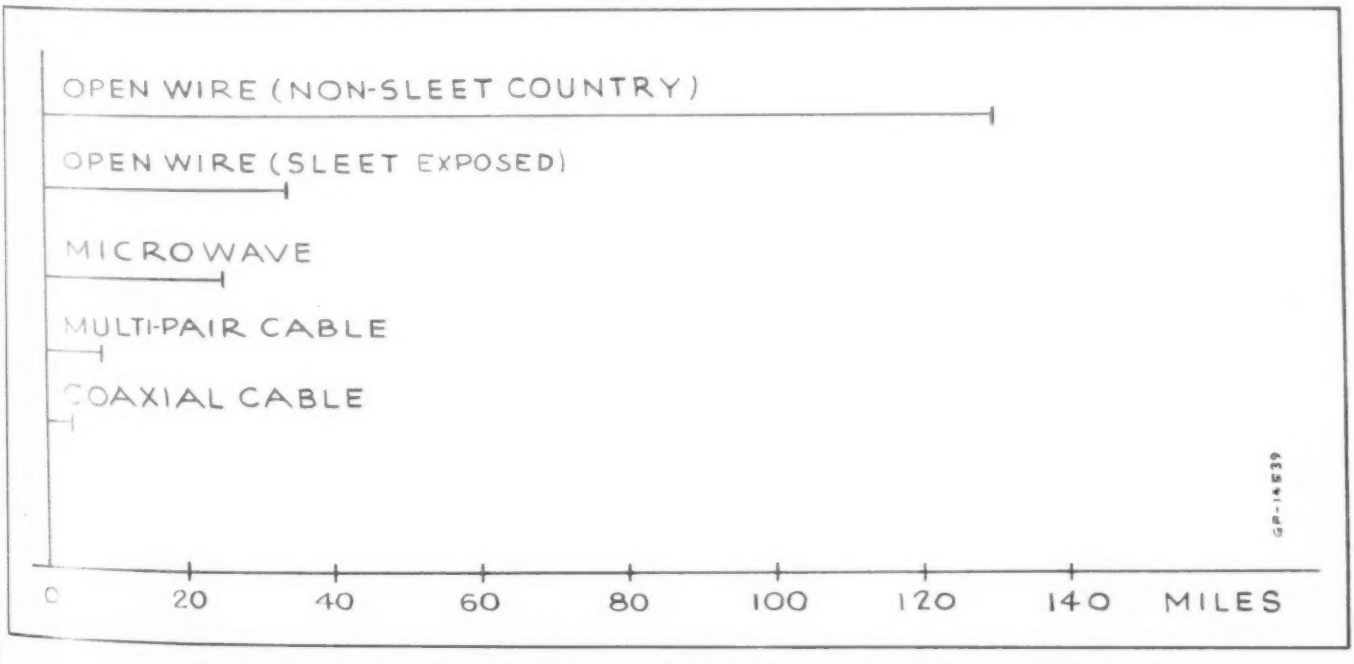


Fig. 1. Representative lengths of repeater sections for various types of multichannel carrier systems.

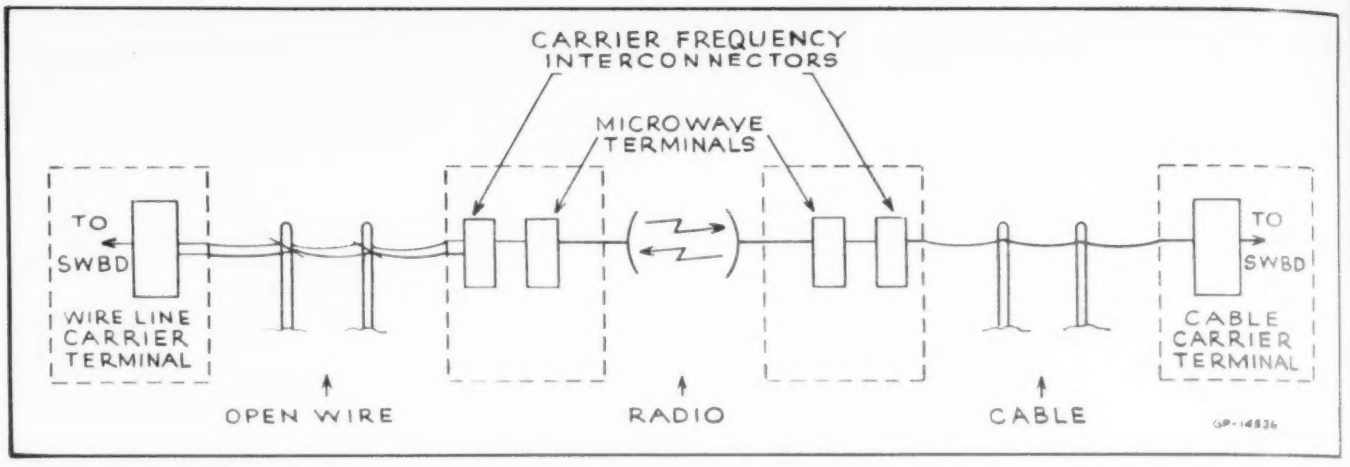


Fig. 2. A properly designed microwave system, coordinating with wire line and cable facilities, can be applied as a carrier frequency repeater between two land-line carrier sections.

situation has changed in recent years. With equipment now available, a single microwave circuit has ultimate toll channel capacity comparable to that of a well-transposed pole lead cross-arm fully equipped with wire line carrier systems.

Furthermore, costs of land-line construction have risen while costs for microwave systems have decreased. So microwave equipment, initially using far less than ultimate channel capacity, will often prove in for distances as short, for example, as those sometimes found in exchange circuits used in regions with extended area dial service.

The name microwave is applied to radio waves with frequencies above about 900 megacycles. At these frequencies, wave lengths are short enough (1 foot or less) to be focused like light. Thus, with antennas appropriately constructed, the available energy can be concentrated into a narrow beam.

Systems using this technique may be laid out along inter-city routes like land lines with the added advantage of using straight airline paths. The only requirement is that the path follow a clear line of sight between stations. Obstructions are likely to introduce serious transmission losses and disturbances.

Evaluating Microwave

Although microwave's ancestry in the radio industry has endowed it with a terminology all its own, the equipment operates on the same basic principles as other multi-channel facilities. Therefore, it is not very difficult to find a common denominator for purposes of system planning and layout. The outstanding technical characteristics of interest to the user of microwave in the telephone plant can be interpreted with the same general reasoning applicable to the wire-line carrier equipment.

These characteristics are:

(1) Distance between terminals or repeater stations.

(2) Toll-channel capacity.

(3) Quality of performance.

(4) Coordination with other systems using the same transmission medium.

(4) Coordination with other toll transmission facilities with respect to cross-connection and maintenance.

In the following point-by-point comparison these five characteristics of representative 900-megacycle microwave equipment are related to the corresponding characteristics of conventional land-line carrier.

(1) *Length of Circuit.* The average length of a microwave repeater section is 25 to 30 miles. This is compared with typical land-line carrier system repeater section lengths in *Fig. 1.* The length of a microwave repeater section is shown as about four times the length of repeater sections used in modern cable carrier systems, and as slightly less than the length of open-wire carrier repeater sections on sleet-exposed lines.

(2) *Channel Capacity.* The 900-mc microwave equipment considered typical for this description has an ultimate capacity of up to 72 standard 4-kc spaced carrier channels. With presently produced carrier channelizing equipment, about 56 channels may be derived from one 900-mc microwave radio circuit.

This is almost equivalent to one open-wire cross-arm transposed and equipped for operation with carrier systems to present-day capacity. Use of eight suitable carrier-equipped cable pairs would about furnish a comparable number of channels, although a total of 12 cable carrier repeaters would also be required in a distance equivalent to the length of one radio repeater section.

Since the carrier art is constantly advancing, comparisons of this nature are likely to require revision from time to time. This is particularly true for cable carrier operation, where pending system developments may further improve the per-pair channel yield.

(3) *Performance Quality.* This is perhaps the one communication system characteristic which most stubbornly eludes attempts of simplification. Despite this, it is customary to quote the amount of noise power audible at the receiving end of carrier channels as a quality-determining characteristic of a system. Such a figure is of importance as an operating objective (with about the same degree of approximation as miles-per-gallon performance can be quoted for a certain model car).

With presently available equipment, a 300-mile, 900-mc microwave circuit will meet the toll transmission standards now applied to national long-haul circuits to about the same degree as 800 to 1,000 miles of open-wire line, given a similar amount of care in system layout. This will include maintaining such performance under conditions of deep fade, when the desired signal is weakest and the noise rises.

Over normal terrain, fades will occur less frequently and will be of much shorter duration than the very high sleet transmission losses which are encountered on open-wire lines in many parts of the country.

The performance obtainable with current cable carrier systems will be similar to microwave for long systems.

(4) *Coordination with Other Systems.* This characteristic is very important on open-wire and cable routes where several carrier systems must share the same facility, occupying closely adjacent wire pairs. Coordination refers to the use of compatible frequency allocations and operating levels. Lack of coordination results in severe crosstalk.

In an extreme case, it is possible

that "pick-up" transmission from an adjacent non-coordinated system would produce receiving noise of higher volume than the desired speech actually being transmitted over the system itself.

On microwave circuits, coordination is partly assured by the Federal Communications Commission license procedure which provides for clean frequency separations between different transmitters operating in the same area.

This is greatly aided by the beam-directional and short-range characteristics of radio transmission at these frequencies. There is no cross-talk problem (in the same sense as with wire lines) between parallel running microwave circuits, as each transmitter uses a different frequency and each receiver rejects the frequencies used by adjacent circuits.

(5) *Coordination with Other Facilities.* Microwave equipment may be built according to several different plans. There are fundamental differences between frequency-modulation (FM) and pulse-modulation (PM), and there are major subdivisions of PM.

Many of the PM arrangements provide for only a limited number of toll channels, each of which must be connected to the radio equipment at voice frequencies. This may limit economical integration of such a microwave link into the rest of the plant.

Telephone-engineered FM microwave equipment accepts wide bands of carrier frequencies which may be transmitted to the radio equipment over various types of connecting lines or which may be derived at the radio site by conventional carrier terminals as required.

A properly designed microwave system will coordinate with existing and future carrier systems; it may even be applied as a carrier frequency repeater section between land-lines without direct connection to switchboards, as shown in *Fig. 2*.

Distance, Dollars and Decibels

Of the principal considerations used for comparison between land-line carrier and microwave, the length of circuit and performance quality deserve special consideration. These two items are closely interrelated, and together they determine the bulk of the cost which goes into new multi-channel systems.

It is well known that all frequencies are attenuated through wire or space transmission, and the power losses are generally rising with rising frequencies.

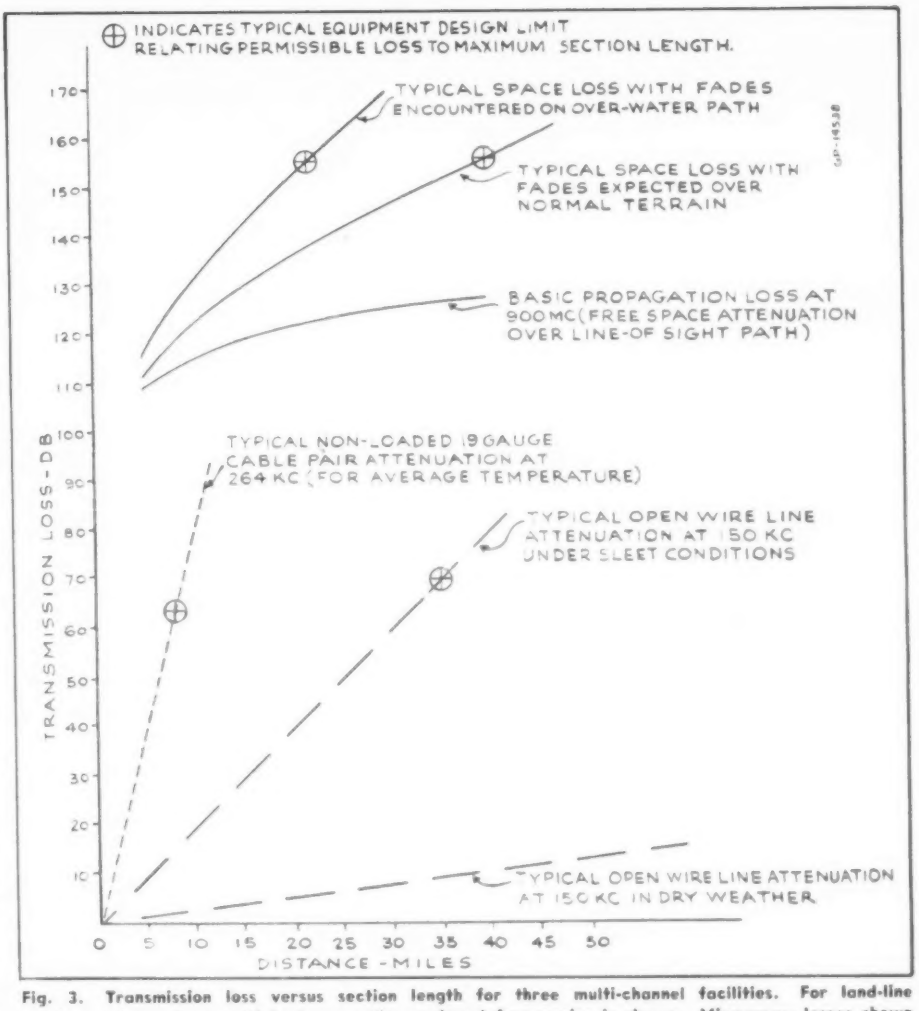

⊕ INDICATES TYPICAL EQUIPMENT DESIGN LIMIT RELATING PERMISSIBLE LOSS TO MAXIMUM SECTION LENGTH.
TYPICAL SPACE LOSS WITH FADES ENCOUNTERED ON OVER-WATER PATH
TYPICAL SPACE LOSS WITH FADES EXPECTED OVER NORMAL TERRAIN
BASIC PROPAGATION LOSS AT 900 MC (FREE SPACE ATTENUATION OVER LINE-OF SIGHT PATH)
TYPICAL NON-LOADED 19 GAUGE CABLE PAIR ATTENUATION AT 264 KC (FOR AVERAGE TEMPERATURE)
TYPICAL OPEN WIRE LINE ATTENUATION AT 150 KC UNDER SLEET CONDITIONS
TYPICAL OPEN WIRE LINE ATTENUATION AT 150 KC IN DRY WEATHER
TRANSMISSION LOSS - DB
DISTANCE - MILES
0 5 10 15 20 25 30 35 40 45 50
10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170

Fig. 3. Transmission loss versus section length for three multi-channel facilities. For land-line carrier systems, loss at highest presently employed frequencies is shown. Microwave losses shown are typical for a broad band of frequencies in the 900-mc region.

In cable and wire line carrier systems, large numbers of channels are obtained by "stacking up" channel frequencies, normally with each channel occupying a 4-kc band (the radio men call this "frequency-division-multiplexing"). As higher frequencies are used, these systems must either transmit at higher power levels or the spacing between repeaters must be reduced as compared to voice and single-channel carrier systems.

Transmitted power has logical limits determined by such factors as available vacuum tube types, power consumption, heat dissipation, and size of components. Received powers cannot be permitted to drop below an even tighter limit which is set by the desired ratio of useful intelligence to noise, a fundamental performance requirement.

The length of a carrier frequency connection can now be computed; it is the distance over which the transmission loss equals the difference between transmitting and minimum acceptable receiving power levels. Values used for such a computation are those applicable to the highest frequency used in the given system.

System planning would follow one standard pattern once these basic operating limitations of a carrier system are known, if it were not that weather conditions affect the magnitude of transmission losses.

This is illustrated in *Fig. 3*. Transmission losses of the highest frequency used for a typical 12-channel open wire line carrier system are shown at the bottom of *Fig. 3*.

Repeater sections of up to 130 miles will meet the loss/quality requirement under average weather conditions. However, with ice forming on the wires, the system would be giving degraded performance for a good number of winter hours and would be out of service, at least partially, for some appreciable time.

Therefore, in areas where ice and sleet are regular winter occurrences, such a system should be conservatively laid out so that toll-grade performance can be maintained for about 99.9 per cent of the time. The relatively short repeater section (about 35 miles) is a price paid for the all-year-round uninterrupted quality service record.

(Please turn to page 41)

★ ★ ★ IN THE ★ ★ ★ NATION'S CAPITAL

by FRANCIS X. WELCH WASHINGTON EDITOR

FCC Commissioner urges use of telephone and telegraph communications by industrial users such as pipelines, railroads, etc. REA adopts new pre-loan procedure for telephone loans. Election results of interest to regulated utilities.

FOR THE telephone industry, one of the most significant statements, by a public official, passed virtually unnoticed in the press last week, because of the preoccupation over Indo-China, l'affaire McCarthy, and other more sensational developments. It was a calm and competent address by FCC Commissioner Robert E. Lee, delivered at the Carlton Hotel in Washington, D. C., where the Industrial Communications Association was having a conference.

The Industrial Communications Association is a group representing business concerns which have special need for radio communications as part of their operation. There are two-way mobile and point-to-point radio facilities for industrial organizations, such as trucking companies. The ability to redirect vehicles in transit, communicate between office and vehicle, and to coordinate vehicle transportation between various pick-up and delivery stations has become an essential part of modern commercial transport service.

But it may surprise some readers that the two sister utility industries of the telephone companies—electric utilities and natural gas pipelines, and affiliated oil operations—are actually the principal users of industrial radio today. Commissioner Lee gave some interesting figures on this:

"Power utility companies are the heaviest users of industrial radio today. The use of two-way mobile communication by the power industry has resulted in greater safety to the general public, continuity of service, and rapid restoration of service when it is disrupted. This has more than justified the establishment of such a service. The commission's books now show nearly 7,400 authorizations to power utility companies.

"Petroleum and natural gas industries are running a close second to the power utility companies in the use of radio. It is being employed in locating new oil fields both on and offshore, drilling new wells, operating producing fields, and in working almost every oil and gas pipeline system in the country. There are about 5,300 authorizations to oil and gas companies. . . .

"The ability to redirect vehicles in transit, to communicate between office and vehicle and to coordinate action between two or more separated points are typical of our modern industrial communication requirements. Such things are no longer regarded as luxuries; they are services essential to daily business operations. There are more than 6,000 authorizations to meet special industrial radio requirements.

"Additional industrial radio authorizations of the commission include nearly 1,000 to organizations engaged in lumbering or handling forest products; over 600 to industrial firms requiring low-power radio aids; nearly 70 to newspapers for directing autos carrying reporters and photographers on assignment; 30 to motion picture producers for directing out-of-door scenes and maintaining location contacts; nine to agricultural reporting activities; and about 120 to land radio location services for geological and geophysical exploration.

"This makes a total of about 20,600 authorizations for nine categories of activities in the Industrial Radio Services."

But it was the balance of Commissioner Lee's address which tells the real story of its significance to the telephone business. In this connection, it is necessary to recall that one of the most controversial questions before the Federal Communications Commission today involves an effort by the state of California to use its own statewide microwave radio relay system for eventually handling certain classes of communications which might otherwise be handled over commercial telephone systems.

This has brought into focus a basic principle which may have to be reviewed in the light of recent technical improvements and operations in the communication field. Broadly stated, the question is one of drawing a line between (1) the proper use of privately owned and operated (whether by a state or a non-communication industry) systems for the exchange of strictly intrasystem messages; and (2) the conservation of available radio frequencies by diverting communications traffic to established common carriers (telephone and telegraph companies) which have a public service obligation. That is perhaps an oversimplification of the issue, because there also arises the question of the more economical and efficient uses which the telephone and telegraph companies claim they can make of these frequencies if they are assigned to them as regulated carriers.

Anyway, there are some important decisions which will have to be made on this by the FCC. Hence, the significance of the following clew to at least one member's reasoning. That member is Commissioner Robert E. Lee, who made the following comment on this general subject:

"The fundamental problem of frequency availability is present in all of the spectrum that we know how to use. I expect, in spite of the advances our country's engineers will make in utilizing and expanding the spectrum upward, that we here in the United States will forever be equally ingenious in finding good uses to make its new-found space equally precious.

"For these reasons, we must not forget and must make use of communication facilities other than radio whenever possible. In any case, where fixed point-to-point communication is required, main reliance must be placed on the common carrier facilities furnished by the telephone and telegraph companies if we are to make the most effective use of the limited available spectrum space."

Lee went on to remind his listeners that both the FCC and the state regulatory commissioners have the responsibility of seeing that the services of the telephone carriers are good and

that they are furnished at reasonable rates. Furthermore, the law requires that such carriers furnish either wire or radio communications service on reasonable request. It is available to all the public and is capable of providing point-to-point mobile radio and practically every communication requirement.

Speaking of the progress recently made by the telephone carriers, along this line, Lee said:

"The common carriers have accomplished unprecedented improvement and expansion in the postwar years. The Bell System, for example, has added more than 19 million telephones since the end of World War II. This is in contrast to the 22 million telephones installed in the almost 70-year life of the Bell telephone up to 1945. The telephone industry has now passed the 50-million mark.

"Approximately 5 million telephone circuit miles are provided to microwave relay. Over 50,000 miles of broad band channels—microwave and coaxial cables—are available to carry television programs.

"The expansion of facilities to provide for this growth has unquestionably included the anticipated requirements of industry for additional communication between plants and offices in different cities.

"Other new or improved services have been offered by the common carriers since the war. Faster long distance service with over 40 per cent of the calls being dialed, and increased mechanization in both the telephone and telegraph businesses, indicate the progress being made by common carriers in meeting their responsibility to you and to the general public in providing adequate and speedy communication."

He also mentioned private-line, teletype, Telefax, and TWX services which are being made available on an ever expanding basis. The telephone and telegraph companies are furnishing channels for telemetering, signaling and remote control industries requiring such services are commonplace performance. Specialized terminal facilities have been developed by common carriers and made available in many areas. New dispatching switchboards, consoles for remote control and supervision of pipeline valves, power company circuit breakers and pilot wire relay networks are additional evidence of the increasing interest of the telephone and telegraph companies in meeting the requirements of their sister utility industries and other nonutility industries. More than 4,000 American business firms are now using private wire telegraph systems, leased from Western Union.

All told, it would seem that Commissioner Lee is conscious of the important service which the common carriers (meaning telephone and telegraph companies) perform for other businesses. "In planning private communication systems," Lee warned his listeners, "some of you may apply for frequencies which cannot be justified in the public interest." Accordingly, he advised them to "study and be fully aware of the vast reservoir of common carrier facilities already available before arriving at your decisions."

Reminding his audience that telephone and telegraph companies had invested billions of dollars in plant, including great research laboratories, he concluded: "Service by common carriers, subject to reasonable regulation, is the American way of avoiding the economic waste that unnecessary duplication of communication systems creates. I think you will find that the common carrier services are the first and best bet for most of your communication problems."

New REA Rural Telephone Policy

REA has adopted a new pre-loan procedure to step up the processing of loans for rural telephone service. The main feature of the changed set-up is a recently revised standard contract for engineering services, which REA recommends for use by applicants for loans. The new procedure combines into a single engineering study a number of different engineering steps which have proved time-consuming to telephone organizations which had applied for loans to provide modern telephone service in rural areas.

Under the new contract, consulting engineers will complete the fundamental engineering studies before the REA loan is made. Such a procedure is expected to shorten materially the time required for REA to process loans and to advance construction funds to borrowers. It was adopted after being discussed with and endorsed by a recent conference of consulting engineers in telephone plant construction from all parts of the country.

Incidentally, during April REA made electric loans amounting to 14.8 million dollars and telephone loans amounting to 5.9 million dollars, according to an Agriculture Department announcement last week. The telephone loan total is more than double the amount loaned in that program in April, 1953. The electric total exceeds the previous April by approximately 55 per cent. The month of April completed a full year of REA activity under Administrator Ancher Nelsen, who took office Apr. 29, 1953.

During this 12-month period, REA electric loans totaled 181.1 million dollars, as compared with 157.6 million dollars during the previous year. Total telephone loans during the 12 months amounted to 56.8 million dollars, compared with 56.6 million dollars in the previous year.

Electric loans were made during the past year in 42 of the 45 states having REA-financed facilities. Telephone loans were approved in 32 states. More than 23 per cent of the electric loans was for generation and transmission facilities.

Commenting on the loan totals, Administrator Nelsen said: "I have never thought the success of a federal program should be measured in terms of how much money is dispensed. But I do think our record to date shows that we are meeting the loan needs in the electric and telephone programs. We are constantly simplifying our loan procedures in both programs so that we can give loan applicants faster service and operate the agency at less cost."

Primary Casualties

Of passing interest to regulated public utilities was the negative result of two primary elections in an otherwise quiet voting on May 4. One came from Ohio where sitting congressmen, both Democrats and Republicans, won renomination of their respective parties with a single exception. That exception was the veteran from the downtown Cleveland district, Rep. Robert Crosser, who has served in the lower House of Congress longer than any other member of it, with the exception of minority leader, Sam Rayburn, Texas Democrat.

Like Rayburn, Representative Crosser was a Democrat and by virtue of his seniority he was the chairman of the important House Interstate and Foreign Commerce Committee when the Democrats had control of the House. What's more, he would have regained that job if he had been renominated and reelected, and if the Democrats should win control of the House next November.

Crosser, who is 79 years of age, was not exactly cooperative on any proposed amendments to the various regulatory laws. All such amendments, such as bills to amend the Federal Communications Act, the Federal Power Act, the Natural Gas Act, etc., had to pass through his committee. And Crosser generally saw to it that they did not pass if he had anything to do about it.

Strongly pro-labor, Crosser had no great sympathy for problems of regulated business, especially public utilities. His usual attitude was to sit tight and do nothing, and his position was that the Federal Power Commission and the Federal Communications Commission, and all the other regulatory commissions, were doing great work as they were set up or reorganized under

(Please turn to page 38)

INDEPENDENTS' PART

in Nationwide Customer Toll Dialing

By L. L. RUGGLES*

AS OUR SUBJECT implies, nationwide customer toll dialing is a cooperative project in which the Independents have a lively interest. The complete job cannot be done by one segment of the industry alone. Independent telephone companies may expect to have ample opportunity to contribute their share of the traffic, and, with the aid of the Independent manufacturers, to contribute constructive ideas on the execution of the plan. As a vital part of one of the world's greatest industries, the entire Independent group must be alert not only to the opportunities offered but also to the responsibilities which those opportunities impose.

I shall attempt briefly to sketch some of the broad plans of the Independent manufacturers who will supply your equipment for meeting the required conditions and standards of performance so essential to high-grade toll service for all telephone users.

As early as 1910, operator toll dialing was practiced in a small way in certain sections of the United States. The circuit lengths involved were then generally much shorter than those over which we can dial today; nevertheless, these beginnings in operator toll dialing led to a number of basic developments in toll dialing techniques which have since been improved until today we are able to dial from one end of the country to the other with accuracy and speed. These early ventures in toll dialing, like local automatic switching, were projects of Independent origin.

As automatic telephone systems became more numerous, more and more cities were connected by dial toll lines, and during the past 25 or more years, operator toll dialing networks have become common. Nationwide toll dialing is, of course, a more recent development, and has required the devising of new methods, the perfection of new equipment, and a greater need for cooperative effort among companies in both segments of the industry.

Manufacturers Know Needs

Your suppliers of equipment are aware of the needs and are actively developing equipment and apparatus to serve the best interests of the industry as a whole. I will try to outline in a general way some of the plans and accomplishments of the Independent manufacturers who will supply your equipment for operator and customer nationwide toll dialing. Operator toll dialing has been established in many places in your systems and the practices are fairly well understood by most operating companies. Nationwide customer toll dialing is, of course, quite new but is making rapid progress and there will be many of you who will be considering the possibility of introducing this plan in your own territories.

Customer toll dialing with automatic toll ticketing was introduced commercially in Europe in 1936 (Ostend, Belgium). The first patent disclosing such a system and equipment for its operation was issued by the U. S. patent office in 1928 to J. Ostline of Chicago. The first commercial installation of automatic toll ticketing in the United States was placed in service in 1944 in California, in a Bell System exchange. This provided for two-party service. About the same time a pilot installation of another type of system was made in an Independent exchange in California for experimental purposes.

Independent companies have since that time introduced customer toll dialing in several sections of the United States and are having successful results, not only with the equipment, but with the machine accounting of their own choice. These first installations by Independents provided for four-party service with automatic station identification. As you know also, the Bell System has made other installations for two-party lines which are reported to be very satisfactory.

First for Short-Haul Dialing

Automatic toll ticketing as originally conceived and practiced, was essentially designed for AB or short-haul toll dialing. The high volume of traffic resulting from community interest among nearby towns offered an opportunity for mechanical equipment to reduce the operating and accounting labor incident to this relatively low revenue business. Most of the systems so far installed have been confined to this form of toll business. In the main, therefore, most manufacturers have produced equipment for short-haul traffic while developing the wider range variety of system. If you will allow me a little license in reporting, I shall try to outline the broad features of systems now being offered by your Independent manufacturers, and give you a brief history of the progress made since the first system was conceived.

The original patent granted on such a system disclosed means and methods whereby subscribers could complete toll connections by dialing. A toll call could be originated by dialing a code to select a trunk to the distant town. It also provided for identification of the calling subscriber by requiring that he dial his own number before dialing

*Mr. Ruggles, who is chief telephone engineer of Automatic Electric Co., presented this as an address at the recent Ohio telephone convention.

the number of the distant station. The dial pulses were registered on a paper tape by a pen register and the time of day and date were stamped on the tape automatically. The elapsed time of the call was recorded by marks on the tape indicating one minute intervals. In order to compute the billing, it was necessary to read the tape by counting the marks indicating the numbers dialed and the number of minutes during which the circuit was used. A verification train checked the calling number and in case an error in dialing occurred, an operator would be alerted to advise the caller to repeat his call.

This early conception was followed by many new ideas which were promptly translated to working equipment. One major improvement resulted in apparatus for automatically detecting and recording the calling number. This was printed on a tape along with the called number and other pertinent information but the timing of the call was indicated by holes punched in the tape to indicate one-minute intervals. This eliminated a little more labor but the tape still had to be read and manually processed before a ticket could be prepared, while the amount of tape needed for each call might be measured in several feet, depending on the duration of the call.

U. S. System Expanded

In 1945, a European manufacturer completed the installation of a system for Mons, Belgium, which printed a complete toll ticket including the computed total charge for the call. This feature reduced the labor involved in toll billing as well as in the switching of the calls. The European systems mentioned dealt only with individual lines. Later U. S. developments have included the use of business machines which will process punched cards made by the ticketing equipment and print complete bills, thus eliminating the manual sorting of individual toll tickets and making the whole process mechanical.

Within the past few years several independent manufacturers have developed systems for automatic ticketing and I shall try to give you some of the highlights of these systems. The manufacturers who offer toll ticketing systems have been good enough to supply me with literature covering their several developments, and while this is my own interpretation, I hope it is both accurate and impartial.

In analyzing the various types of automatic toll ticketing systems being offered by independent manufacturers, I have found it convenient to classify them with respect to the kind of procedure which the calling subscriber is required to follow. By this process I have arrived at five general classifications.

L. L. RUGGLES

To illustrate the five methods of operation, we shall take a very simple case of an automatic telephone exchange arranged for automatic toll ticketing of calls to a single toll point. All of the systems are, of course, arranged to select more than one toll point but it will facilitate our explanation if we take the simple case.

Classified as to Operation

You will understand that the systems described hereafter are not the product of any one manufacturer, but are so classified because of methods of operation as they relate to the subscriber's effort in dialing his own toll calls.

No. 1. The simplest form of toll ticketing system, as far as equipment is concerned, is the type which provides for the subscriber to record his own number in the apparatus by dialing the number. The subscriber's instructions as to sequence of operation would be something like this:

(a) Dial the code assigned to select the trunk to the distant point,

(b) Dial your own telephone number,

(c) Dial the distant subscriber's number.

Most systems within this category provide a means for verification of the calling number as it is dialed by the calling subscriber. In general, only the line number is verified but some systems provide for checking station numbers on party lines as well. This is accomplished by special dials on the telephones, the cost of which may not be justified in this type of system.

Automatic Detection Included

No. 2. In the second general category will be found systems which include automatic detection of the calling line number. The line number, automatically detected, is recorded automatically on the machine. A party line subscriber is required to dial a distinctive single digit to register his station number on the line. Instructions to the subscriber may then follow this sort of pattern.

(a) Dial the code to select the toll trunk,

(b) Dial the last digit of your own number to register your station on the line,

(c) Dial the distant subscriber's number.

Standard dials are used by all calling subscribers.

No. 3. Systems in the third category are similar to those in the second except that automatic detection of both calling line number and station number on party lines is provided. The following instructions would apply to subscribers in this third category:

(a) Dial the trunk code

(b) Dial the called subscriber's number.

Calling stations on party lines require the use of special dials for automatic registration of calling station number.

No. 4. Systems in the fourth category require the dialing of the trunk or access code and the terminating number as in the third group. However, instead of automatic detection and recording of the calling number, the recording equipment is arranged to introduce an operator into the connection. The operator asks for the calling party's number and registers that number by means of a keyset on her position.

Operation Varies Slightly

This general method of operation varies slightly with different manufacturers. In one system, the operator is introduced after the subscriber has dialed the trunk code and before he proceeds with dialing the terminating number. The operator instructs the subscriber to proceed with dialing after she has recorded the calling number. Another system uses a register into which the calling subscriber dials the terminating number after which the operator enters the connection, registers the calling number and starts a machine sender which completes the call. Standard subscriber dials are used.

No. 5. Systems in the fifth category are used in automatic exchanges which employ common control equipment for local as well as toll calls. In systems of this type, the subscriber will be required to dial only the subscriber's

number in the distant exchange. The common control equipment, consisting of registers and automatic senders, will route the call as required and the ticketing equipment will automatically detect the calling number and record it in the machine. Special dials are used by subscribers on party lines.

The recording and tabulating devices used to produce complete toll tickets or to print subscribers' bills cannot be treated fully here. In fact, any one of the five classes of systems I have described deserves much more complete treatment than has been given. The following brief notes, however, may give you some idea of the various techniques used in their design and production.

Tape Perforated

The simplest system uses a toll recording trunk which perforates a tape to record the impulses of each digit dialed by the subscriber as he dials the code for the town being called, then his own number, and finally the called number. The timing of the call is indicated by holes punched in the tape, one for each minute interval. An electronic tape reader collects the recorded information from the perforated tape, and may control a ticket printer for producing a printed ticket, or may actuate a card punch to produce a punched card for use in business machine processing. In such a case, a complete subscriber's bill might be produced by machine methods.

Another system records the dialed impulses on a magnetic tape in the trunk recorder. Sufficient tape is provided in each recorder to store approximately 100 average calls. When the capacity of the tape has been reached, or at predetermined intervals, the tape is read off by electronic equipment which records the tape information and at the same time clears the tape for another group of calls. The tape reader may control a ticket printer or a card punch as described above.

A third system collects the pertinent data on trunk recorders, called "ticketers," consisting of switches and relays which store all of the information required until completion of the call. Only after a call has been completed will a tape be punched to record all of the information pertaining to that call. About 3 inches to 4 inches of tape are required to record the complete information for each call since this system uses teletype code perforations. From the tape thus prepared may be produced a ticket or a punched card. The punched card is then processed for machine billing.

For the sake of simplicity, the descriptions I have briefly outlined cover only short-haul toll dialing. This does *not* imply that nationwide dialing cannot be accommodated on the systems mentioned. In fact, equipment has been designed by Independent manufacturers which will permit short-haul dialing and automatic ticketing initially, with provision for extra apparatus which may be required for expanding the service to nationwide customer dialing.

New Features Necessary

It is true, however, that the problems of nationwide customer toll dialing are somewhat more complicated than those involved in customer dialing of short-haul toll calls and, as a result, there are new requirements for features which may or may not exist in the systems I have outlined. Not having full knowledge of all systems, I shall confine the following remarks to a few of the considerations which must be given to systems capable of processing nationwide customer dialed toll calls.

It is probable that most automatic exchanges installed for local service by Independents will employ switching apparatus controlled directly by a subscriber's dial as contrasted to systems which include some form of common control system using a register-translator-sender arrangement. There are, of course, a great many exchanges of the direct control type now in service, and these probably will be candidates for some form of toll ticketing, as will new exchanges of this type.

Several Independent telephone companies are now using common control equipment in step-by-step exchanges, but these may be considered in the minority since they are installed in metropolitan areas where a universal directory is used, and where subscribers in a large number of connecting exchanges are reached by dialing only directory numbers without prefix or access code.

Such systems, of course, will have advantages in the nationwide plan of customer toll dialing because of the inherent facilities for registering toll and local codes on registers which, with the aid of translators and machine senders, will direct the calls to their proper destinations. Such equipment will, of course, provide for routing calls to terminating points either over preferred trunk routes or via alternate routes which may be provided. No access code is required in such systems.

Other Methods Discussed

Since this type of equipment cannot be justified in most Independent exchanges, let us examine other means for accomplishing the switching functions in a manner compatible with the over-all nationwide plan.

One of the requirements set forth for nationwide customer dialing is that all subscribers' local numbers consist of two letters and five numerals—known as the 2-5 numbering plan. In addition to the local 2-5 number, three-digit toll area codes have been assigned to some 90 numbering plan areas for the purpose of selectively routing calls to the particular area within which the terminating office is located.

Where the local central office switching equipment will allow the dial to directly control the switching functions (such as conventional step-by-step or relay systems), a toll call dialed by a customer will require the following minimum effort.

(1) Dial an access code which will switch the caller to automatic ticketing equipment. This code is equivalent to calling a long distance operator for which various codes are now in use—such as "0," "110," "211," etc. The access code may be 2 or 3 digits to suit local conditions or the type of equipment in use. A three-digit code will be used in most cases however.

(2) If the called station and the calling station are located within the same toll area, it should be possible to complete the call by dialing only the seven-digit number after the access code has been dialed. This possibility exists, of course, where the ticketing equipment will automatically detect and record the calling line and station number. This call within the home toll area would, therefore, require the customer to dial a total of 10 digits of which three are an access code and seven the subscriber's number.

The procedure just outlined used the term "minimum effort" required by the customer for home area dialing. Besides the requirement for automatic detection of calling line and station number, this assumes that the toll switch train in the local office, as well as in the terminating offices, will accept direct dial pulses and will route the call over switching paths which may be selected by the seven-digit number. This procedure will be possible in many cases, but if a connecting office employs common control equipment, all seven digits of the subscriber's number must be sent to that office after the proper trunk group has been selected.

When the called station is in another toll area, 13 digits total would be required—three-digit access code, three-digit toll area code, seven-digit subscriber's number—a total of 13.

Systems which do not provide for automatic detection and recording of the calling subscriber's number could require the subscriber to dial as many

(Please turn to page 36)

THE PLANT MAN'S Notebook

by Ray Blain, Technical Editor

WE HAVE received the following suggestion on contact cleaning from W. E. Nichols, chief engineer, signal section, Headquarters Sixth Army, San Francisco, Cal. According to Mr. Nichols, there is a definite danger to health from excessive inhalation of fumes from carbon tetrachloride, as evidenced from several records of fatalities and numerously reported severe temporary illness cases. He said:

"With regard to inoperative contacts after cleaning with carbon tetrachloride, experience has shown that a residue generally remains on the contact which may cause considerable electrical resistance between contacts to the extent that they will sometimes test open. It appears, however, that the technique in cleaning the contacts is more at fault than is the chemical.

"It is a well known fact that switchmen usually get a strip of cotton sleeving with carbon tetrachloride and then pass it between the contacts to remove the dirt. Examination of the contacts so cleaned with a 5-power glass immediately after the operation show the contact surfaces to be apparently clean, but insulated from each other with minute fibrous particles that have become detached from the wet sleeving.

"Other impurities may dissolve from the sleeve to leave a resistance residue on the contact surface. Repeated use of the same length of sleeving on other contacts results in increased fibrous deposits and film residue from dissolved dirt that is imbedded in the sleeving.

"The following procedure now being field tested on a West Coast dial exchange is proving entirely satisfactory and is described for consideration, trial and comment. Instead of using carbon tetrachloride, Trichloroethlene, a far superior degreasing agent, is employed. This chemical, while superior to carbon tetrachloride, must also be handled with care from the standpoint of noxious fumes.

"A small vial of Trichloroethlene which can be conveniently held in the hand is used with a contact burnishing tool. The blade of the tool is dipped into the bottle and while wet is passed between the contacts to be cleaned. After about three or four passes, the chemical cleaning agent has evaporated and the contacts will be both clean and burnished. Neither is there any residue that can adversely affect the conductivity of the contacts. That this method is effective is evidenced by the darkening color of the liquid from dirt being washed off the contacts during repeated dipping action."

• • •

Col. Alton O. McLane has assumed command of the Signal Corps Plant Engineering Agency, relieving Col. Robert I. Dodge. Colonel Dodge is returning to the American Telephone & Telegraph Co. in New York City.

• • •

We are reliably informed that the use of the hanging handset type telephone is definitely on the increase. There was a time when the use of this type of telephone was confined almost entirely to the kitchen, but it has now come into more general use. Today it meets special requirements for many business concerns as well.

• • •

We have received several queries from readers regarding woodpecker damage to treated poles. Some claim that these birds prefer a certain type of wood or wood preservative. To the best of our knowledge, the woodpecker will damage either an untreated pole or one treated with creosote or Penta, if and when it strikes his fancy.

In support of this assumption, the following is quoted from a letter of Mr. P. B. Mayfield, technical consultant of the Barrett division of the Allied Chemical & Dye Corp.:

"Woodpeckers don't peck on creosoted poles because they like the creosote as actually it never comes in contact with any sensitive part of their bodies. Both the bill and the end of the tongue are hornlike material.

"I once inspected woodpecker damage along a railroad right-of-way. On one side there were full-length creosoted poles and on the other side butt-treated poles. There were many more attacks in the upper section of the butt-treated poles than in the full-length creosoted poles.

"At one time, some claims were made that Penta poles would not be attacked by woodpeckers. However, I saw a line in the south where pole after pole was replaced in a Penta-treated line, due to woodpecker attack."

• • •

The Dillon dynamometer now meets a need of long standing in the telephone industry for the testing of linemen's safety belts. Belts are not only tested for their breaking point but also for the amount of kinetic energy absorbed.

The device that uses the Dillon dynamometer for this test is claimed to have eliminated the use of the cumbersome, expensive and time-wasting testing equipment formerly considered necessary for this purpose.

This device consists essentially of a hoist, suspended from a tripod, which exerts a pull against a safety belt positioned around a drum, used to simulate the pressure caused by a man's body. The drum in turn is connected in series with the dynamometer. The complete device is anchored to the base of the tripod.

A slow motion camera is used to record both the poundage of the dynamometer dial as the tension is increased and the safety belt stretches. This provides an accurate reading of the kinetic energy expended, the ability to withstand shock and the actual breaking point of the belt.

• • •

It has been said that no one is entirely useless. Even the worst of us can serve as a horrible example.

The OPERATOR'S CORNER

by MAYME WORKMAN, Traffic Editor

AN ARTICLE which appeared in the Feb. 20 issue of TELEPHONY, by C. O. Bickelhaupt, was undoubtedly read with interest by every oldtimer in the telephone industry and proved to be an "eye opener" to the younger clan.

Among the comments received by the editor of TELEPHONY was one from Manta J. Elder of Ottawa, Kan., whose service record dates back to 1906, 48 years ago. In her letter to the editor Miss Elder stated: "This is to tell you how very much I enjoy TELEPHONY. There are special numbers, of course, and the ones I have lately enjoyed are the issues of Jan. 23-30 and Feb. 6; the three 'Operator's Corner' articles were of great interest to one who is on the 'side lines.'

"The Feb. 20 issue is of deep interest for me because of the article, 'Fifty Years Ago,' by C. O. Bickelhaupt. As my telephone experience dates back to 1906, this story sounds very familiar.

"I can recall when our plant men in Ottawa encountered similar experiences and in that day traffic people knew much more of the plant work than they do these days.

"The operators were often of great help to a maintenance man or 'trouble shooter,' as we called him, in testing lines for him while he was working on them.

"Mr. Bickelhaupt speaks of liking to work on the rebuilding of a switchboard which recalled to me a young lady in our Independent company office helping our manager build a position for our switchboard. This girl could do almost any of the mechanical work in the office and, although later she became the chief operator, all of us, including herself, felt that the maintenance work of the switchboard lost a fine workman.

"In fact she never did drop that work entirely. The men all liked her work but they were careful to not stir up her Irish temper. Like most quick tempered people, she could flare up and talk back but soon calmed down and never carried a grudge. One day a plant man was working on a toll circuit and was high up on the pole when he called her for a test and, because it was a bitter cold day with blowing snow and he was cold, he became impatient with what he called her 'slow work,' and made the mistake of swearing at her.

"She could take almost any discourtesy from the men during the cold winter days when she realized it was prompted by discomfort. However, she would not stand for profanity when directed at her. She promptly told him, 'Just for that you can just wait there until one of the men come in to test with you. I'm through!' She was and he did wait.

"Many of the operators, including myself, wound coils, repaired out-of-order plugs, cleared the drops on the magneto board and repaired switches.

"I have always been glad I came up the hard way. It is a real pleasure to remember the many happenings of those 'good old days,' even though we were often overworked and underpaid, cold in the winter, hot in the summer, working in poorly ventilated offices—we lived through it all and now we see others reaping the results of those days. After all, that is the joy of living for, we too, reap the great reward of knowing our work was well done, a good foundation left for the workers of the present day and the years to come. Thank you for publishing such wonderful articles."

Thank you, Manta, for your interesting resumé of your early days in the telephone industry, your fine philosophy, and appreciative comments regarding our publication.

In her letter to the editor of TELEPHONY, Miss Elder expressed the spirit of the Pioneers in stating that the hardships endured in the early days of telephony were worthwhile because they left a good foundation for the workers of the present era and for the years ahead.

If you have not read Mr. Bickelhaupt's article "Fifty Years Ago," dig out the Feb. 20 issue of TELEPHONY and do so. You will enjoy the manner in which he relates his experiences in the pioneer era of telephony.

Another interesting article appearing in this issue is "A Look at the Past—Telephony predicts TV in 1906" by Georgia Learned, TELEPHONY's associate editor. Operators who worked in the early 1900's will recognize Daisy Dunlap's mode of attire which is typical of that era, pompadour and all. Since TV is now an accomplished fact, to know that it was predicted way back in 1906, long before many of our present day operators were born, is indeed interesting.

In a recent gathering in my home, TV was the topic of conversation and in due course someone remarked, "You don't have a TV set, do you." To which I replied in all seriousness, "No I don't. Frankly, I don't find time to listen to the radio much less sit for hours before a TV set. When I become too old to be active, I'm sure I shall enjoy TV as much as anyone."

Then I saw an amused expression on the faces of my friends and it dawned on me that they all have TV sets and not one in the group is nearly as old as I. Well, anyway, we all had a good laugh about my remark and I came in for a lot of ribbing.

I am reminded of my cousin's experience recently when she took her 9-year-old grandson on a shopping tour. Like most youngsters that age, he was interested in everything they saw as they went from one store to another. When they returned home my cousin remarked, "My goodness, Grandma is tired! Grandma is getting old."

The boy asked, "How old are you, Grandma?," to which she replied, "over 60." "Gee," said her grandson, "you're not *getting* old, Grandma, you *are* old!" And to be sure, to a nine-year-old's way of thinking, his grandmother really was old.

(Please turn to page 4[illegible])

REA Approves Five Rural Loans

To extend and improve telephone service in rural areas of South Dakota, Texas, Kansas, Kentucky and Wyoming, the Rural Electrification Administration approved $1,632,000 in loan funds during the week of Apr. 26-30. Details of the five loans follow:

Brookings (S. D.) County Telephone Cooperative Association, Inc., on Apr. 28, $429,000 to finance the improvement and extension of rural telephone service in Brookings and Moody counties.

With the REA loan, the applicant expects to construct a modern system to bring improved service to 466 existing subscribers, and initial service to 199 rural families now without telephones.

As a first step in the project, the borrower has acquired the Brookings County Public Service Co., now furnishing inadequate service to 466 subscribers over 248 miles of line. The new cooperative plans to rehabilitate 198 miles of the acquired line, build 137 miles of new line and construct a new dial central office in the rural area near Brookings.

The completed system will consist of 335 miles of line. Ray E. Barnett is president of the Brookings County association and James Dorn is acting as manager temporarily.

* * *

South Plains Telephone Cooperative, Inc., Lubbock, Tex., on Apr. 28, $114,000 third loan to this borrower.

With the three REA loans, totaling $1,476,000, the borrower is constructing a modern system, consisting of 12 dial central offices, and 1,281 miles of line, to serve 2,155 subscribers primarily in Lubbock, Hale, Crosby and Floyd counties. These totals are somewhat less than originally contemplated due to more recent surveys which indicated fewer potential subscribers in the operating area.

The first three sections of the system have been completed and were cut over to dial in early 1953. Dial central offices in that portion of the system are located at Hollandville, County Line, Merrell, Halfway, Happy Union, Acuff, Woodrow, Cotton Center, Caprock, Cone and McAdoo.

Telephone properties in the remaining Edmonson section of the system were acquired and integrated with the second REA loan to the borrower. The Edmonson exchange area was completed and cut over to dial operation in February of this year. In all, the South Plains cooperative is furnishing dial service to approximately 1,400 subscribers.

The new loan will be used primarily to cover increased construction costs incurred since the previous loans were approved. F. H. Bradford is president of the South Plains cooperative.

* * *

Cimarron Valley Telephone Association, Inc., Meade, Kan., on Apr. 30, $41,000 second loan to this borrower.

The new loan, together with the first loan of $360,000 approved in October, 1952, will be used to improve and expand service in rural areas of Clarke and Meade counties.

The Cimarron Valley association plans to acquire from the Western Light & Telephone Co. of Kansas City, the telephone properties in and around Englewood and Ashland now serving 733 subscribers over 222 miles of line, and 22 switchers.

About 146 miles of the acquired line will be rebuilt, 47 miles of new line added, the Englewood exchange converted to dial, and the Ashland common battery central office rehabilitated. The expansion will enable the Cimarron Valley association to provide initial service to 137 rural families now unserved, and improved service to the existing subscribers as well as to the 22 switchers who will abandon their own lines and become regular subscribers of the borrower.

The completed system will consist of 247 miles of line. Louis Chappell is president and Otis Allison is manager of the Cimarron Valley association.

* * *

Foothills Rural Telephone Cooperative Corporation, Inc., Paintsville, Ky., $794,000 second loan to this borrower.

This loan will be used to finance the construction of 300 miles of line, two additional exchange areas, and other facilities to serve 1,797 subscribers not planned for in the first loan of $398,000 which was approved in October, 1952.

With the two REA loans, the borrower plans to construct a modern system to serve 2,753 subscribers, including 2,353 presently unserved rural families and establishments. Dial central offices for the system will be located at Salyersville, Blaine, Staffordsville, Chapman and Fallsburg. The Staffordsville building will also house commercial office equipment. According to present plans all subscribers will be able to call their respective county seats without toll charge.

Upon completion of the project, the Foothills cooperative will consist of 484 miles of line in Magoffin, Johnson and Lawrence counties. J. Milton Kitchen is president and Duell Williams is manager of the Foothills Telephone Cooperative.

* * *

Tri-County Telephone Association, Inc., Basin, Wyo., on Apr. 30, $254,000. These funds will be used to finance the improvement and extension of rural service in the borrower's service area located in the west-central part of Big Horn County and the northeast portion of Washakie County.

The borrower plans to acquire with its own funds the facilities of the Bench Canal Telephone Co., Emblem, Wyo., and with a combination of its own and loan funds the Ten Sleep (Wyo.) Telephone Co. These companies are now providing magneto service to 115 subscribers over 103 miles of line as well as switching service to nine subscribers owning their own lines.

Tri-County plans to convert the Ten Sleep magneto central office to dial and construct a new dial office at Burlington. About 68 miles of the acquired line will be rebuilt and 185 miles of new line constructed. The improved and expanded facilities will enable the new cooperative to serve 478 subscribers, including 363 now without telephones. In addition the borrower will continue to serve the nine switchers.

The completed system will consist of 253 miles of line. Earl Davis is president of the Tri-County Telephone Association.

They're bringing you a Better Tomorrow!

Automatic's large, well-equipped research staff is constantly searching for the new, the improved, the better way. To you their work is bringing more advanced equipment, ultra-modern service, increasingly profitable operation—a better tomorrow.

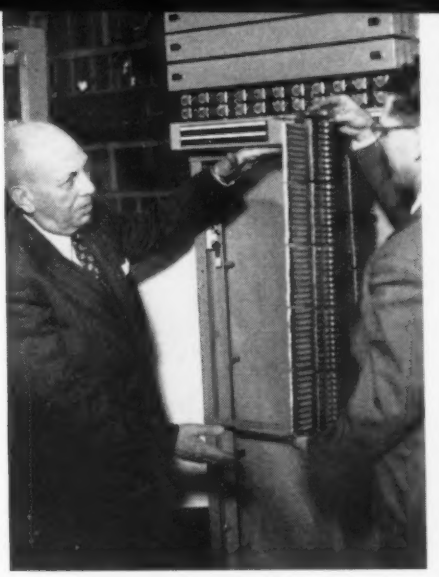
They have great plans for you, these men!

They're the key men of Automatic's extensive research staff. Each is an authority in his field—this one on automatic toll ticketing, that one on switching systems, and that one in electronics. They are imaginative men—men with inquiring minds. They know that patient study of even remote possibilities may bring you maintenance-cutting improvements in automatic switching, transistor-equipped voice repeaters operating at 90% power savings, or telephone components so advanced that they will surpass today's most optimistic estimates.

These men are charged with maintaining Automatic's leadership in research. They're adding new achievements to Automatic's more than 60-year record of "firsts," among which are: the automatic exchange, the dial, the modern handset telephone and automatic toll ticketing. They're also adding valuable new information to the great store of telephone know-how which has made Automatic respected throughout the world.

Keep your eye on Automatic's research men. They're bringing you a *better tomorrow!*

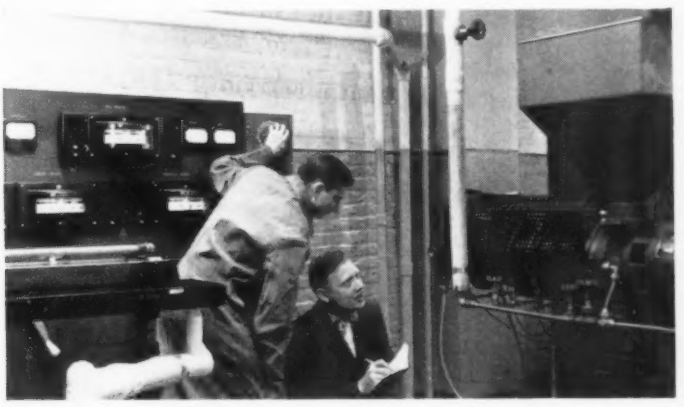
Left to right, C. F. Ffolliott, J. F. Harm, E. S. Peterson, R. J. Maguire, L. F. Crabtree, J. E. Ostline, F. E. Wood, O. D. Grandstaff, I. Molnar, R. C. Stiles, and R. P. Dimmer.



"It makes a more economical mounting for this toll ticketing detector."

"A design revision here will give this rotary switch greater bank capacity."

"This will show us how to get smoother switch operation."



"Let's see if Compound 12 has better insulation resistance."

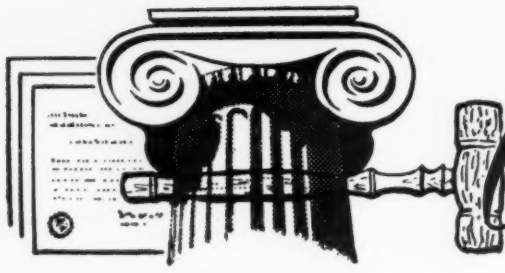
"With transistors, the aim is surer processing—and a surer product."

AUTOMATIC AE ELECTRIC

Originators and Developers of the Strowger Step-by-Step "Director" for Register-Sender-Translator Operation . . . Machine Switching Automatic Dial Systems

Makers of Telephone, Signaling and Communication Apparatus • Electrical Engineers, Designers and Consultants

Distributors in U. S. and Possessions: AUTOMATIC ELECTRIC SALES CORPORATION
Export Distributors: International Automatic Electric Corporation
1033 West Van Buren Street, Chicago 7, U. S. A.



Courts and Commissions

FCC O.K.'s Sale of Detchon, Other Properties to Ind. Bell

The Federal Communications Commission on May 6 gave final approval to the sale by Hoosier Telephone Cooperative, Inc., Indianapolis, Ind., of 13 telephone companies in west central Indiana to Indiana Bell Telephone Co. (TELEPHONY, Oct. 10, 1953, p. 38).

In its order, the FCC said that testimony presented in a hearing at Washington, D. C., on Mar. 22 showed that the sale of the companies to Indiana Bell was in the best interest of the public.

The 13 companies serve about 12,000 telephones in 30 exchanges in Fountain, Benton, Montgomery, Vermillion, Tippecance, Carroll, Putnam, Newton, and Warren counties.

R. R. Hirschman, assistant vice president of Indiana Bell, said the company would take over operation of the companies probably within a week.

He added that the companies would continue to be operated as separate companies during the period that the rehabilitation and improvement of service was carried on.

Indiana Bell appointed a special group of officers to direct operations of the companies; Mr. Hirschman, president; J. W. Kingsbury, vice president; H. P. Ball, auditor, and J. B. Thompson, secretary and treasurer. C. R. Barkman was named general manager of the 30 exchanges.

The FCC approval came following a contract between the Hoosier Cooperative and Indiana Bell for the sale of the stock of the companies (TELEPHONY, Apr. 17, p. 25).

In announcing the contract, Evans Wilson of Pendleton, president of the Hoosier co-op, said that its primary purpose was to furnish a good grade of telephone service and to provide area-wide coverage. He stated that the sale to Indiana Bell would achieve this objective because he and the Hoosier board of directors were confident that Indiana Bell could and would furnish the high quality telephone service so badly needed by the rural areas.

The 13 companies are Attica Telephone Co., Cayuga Telephone Corp., Citizens Mutual Telephone Co., Citizens Telephone Co., Coal Creek Telephone Co., Darlington Telephone Co., Fountain Telephone Corp., Indiana Western Telephone Corp., Ladoga Telephone Co., Oxford Telephone Co., State Line Telephone Corp., Wabash Prairie Telephone Corp. and Wabash Valley Utilities Corp.

They serve exchanges at Attica, Covington, Stone Bluff, Oxford, Darlington, Dana, Ladoga, Cayuga, Buck Creek, Burlington, Morocco, Veedersburg, Waynetown, Mellott, Newton, Russellville, Waveland, Williamsport, West Lebanon, Ambia, Tab, Pence, State Line, Kingman, Cates, Newport, Boswell, Otterbein, Pine Village and Freeland Park.

On the same day, the FCC also gave final approval to the sale of the Spencerville Telephone Co. to Indiana Bell (TELEPHONY, Aug. 1, 1953, p. 36). The exchange at Spencerville serves about 170 telephones.

Mr. Hirschman said that Indiana Bell would take over operation of the exchange within a few days.

The Spencerville exchange was owned by William M. and Ethelyn Miller. At a hearing conducted by the Indiana Public Service Commission last October, evidence was presented that they wished to retire from the telephone business.

On May 6 the FCC also gave final approval for the sale of the Taylorsville Telephone Co. and three exchanges of the Hope Independent Telephone Co. to Indiana Bell (TELEPHONY, Jan. 30, p. 34).

The commission's decision followed the hearing held in Washington, D. C., on Mar. 22.

Mr. Hirschman said the company would not be able to assume operations of the seven exchanges until necessary financial matters are completed. He said he was hopeful that those details could be cleared up within eight to 10 weeks.

Previously owned by Max Hosea, the exchanges involved are at Clifford, Elizabethtown, Taylorsville, Crammer, Hope, Hartsville and Flat Rock. They serve more than 1,000 telephones.

Oregon Commissioner Gives O.K. to Prior Note Issue

Oregon Public Utilities Commissioner C. H. Heltzel on May 7 authorized the Parma (Idaho) Telephone Co. to issue two notes payable to Idaho First National Bank of Parma, not in excess of $14,930.58 and $4,027.02.

The notes are to be secured by a mortgage substantially in the form of that issued as security for notes dated Mar. 5, 1953. The notes bear a 5½ per cent interest rate.

The Parma company's property is located 93 per cent in Idaho and 7 per cent in Oregon. The commission order further stated:

"The state of Idaho has no jurisdiction over security issues of telephone companies, and applicant (Robert H. Brown, doing business as the Parma Telephone Co.) represents that he did not realize that he was required to file an application for approval of said loans with the commissioner.

"As of Apr. 21, 1954, the balance owing on the first note of $25,000 was $14,930.58, and $4,027.02 on the second note of $5,000.

"Applicant should now issue new notes covering the balance of $18,957.60 due as of the date this application was filed.

"The securities proposed to be issued herein are lawful. Applicant expended a net sum of $32,860.15 during the year 1953 for dial conversion of the Parma exchange and general plant improvements and it has been necessary for applicant to raise additional capital."

V V

Five Indiana Companies File Petitions

The Indiana Public Service Commission recently received rate increase applications from the New Lisbon Telephone Co. and the Central Mutual Telephone Co.

The commission also received other Indiana company petitions as follows:

The Smithville Telephone Co., for authority to issue 489 shares of capital stock;

The Princeton Telephone Co., to issue and dispose of $600,000 aggregate principal amount of first mortgage sinking fund, 3¾ per cent Series A bonds;

The Batesville Telephone Co., for approval of the purchase of certain telephone properties in and around Holton;

approval of proposed construction program at Holton, certificate of territorial authority, approval of a schedule of rates and charges; and authority to borrow $100,000 on a short-term basis.

V V

Two Georgia Independents Secure Rate Increases

The Georgia Public Service Commission recently authorized increases in the rate schedules of the Broxton Telephone Co. and the Ringgold Telephone Co.

Increased rates for the Broxton company were conditioned upon certain improvements in the service the company was rendering. The rates the company proposed and the approved rates are as follows:

	Proposed	*Approved*
One-party business	$6.50	$5.00
Two-party business	5.50	4.00
Four-party business	4.50	3.00
One-party residence	4.25	3.25
Two-party residence	3.75	2.75
Four-party residence	3.25	2.25
Rural multi-party		
Business, 0-2 miles	4.00	4.00
Residence, 0-2 miles	3.00	2.75
Each additional 2 miles or fraction thereof	.25	.25

The commission order to the Broxton company also stated:

"It was alleged that based upon 99 stations in service, including six held orders, local service revenues from the rates proposed would amount to $5,037 per annum.

"Every other item of revenues and expenses represents an estimate with the possible exception of depreciation expense and even this is based upon an estimated cost of depreciable property.

"There is no evidence as to actual cost of operation in Broxton, either before conversion to dial operation, or thereafter. The exchange has been operated on dial service since Mar. 7, 1953, and yet the records of the company do not appear to be in such shape as to permit the determination of actual or a reasonable allocation of operating expenses.

"Rates cannot be fixed on estimates alone, but should be based on cost of service. In this case, therefore, rates will be authorized at a level in effect in other exchanges of comparable size and type.

"These rates are substantially lower than requested by the company and are all that can be authorized under these circumstances."

The Ringgold company's old and new rates schedules are:

	Old	*New*
One-party business	$5.00	$6.00
Two-party business	4.00	5.00
Five-party business	3.00	3.75
One-party residence	3.25	3.75
Two-party residence	2.75	3.25
Five-party residence	2.25	2.50
Rural multi-party business, 0-2 miles	2.50	3.00

Red-"d" to Serve You with Established Quality Wire··

BACKED BY ONE POLICY

® Trade Mark Reg., Copyright 1953 by Diamond Wire & Cable Co.

● "AT YOUR SERVICE"... more than mere words when you team up with the big Red-"d". Here's established quality Telephone Wire. Here's fast service that means your telephone supply jobber will meet your installation schedules. And behind it all stands one policy . . . a fair price!

New 1954 Catalogs are now available at your Telephone Supply Jobbers.

Trade Mark

DIAMOND WIRE & CABLE CO.
SYCAMORE, ILLINOIS
Manufacturers of Red-"d" Electrical Wire

Rural multi-party residence, 0-2 miles....	2.50	3.00
Each additional 2 miles or fraction thereof	.25	.25

The commission decided that the net revenue the Ringgold company realized should be some greater than at first estimated, considering the fact that taxes were estimated at an amount somewhat more than apparently will be due and payable, and that local service revenues should be slightly higher if based on billings rendered rather than actual collections in the period. While no specific adjustments were made by the commission, it appears that the return on investment should be approximately 6½ per cent when these conditions are reconciled.

The commission also stated:

"According to the evidence, gross plant and equipment as at Dec. 31, 1953, represented an investment of $100,839.

"From this amount was deducted the reserve for depreciation of plant and equipment amounting to $18,325, resulting in net investment in plant and equipment of $82,514.

"To this amount was added $2,085 as cash working capital, resulting in a total investment in telephone plant and equipment of $84,599 as at Dec. 31, 1953.

"The net investment of $82,514 is equivalent to $130 per station for the 633 stations served, which does not appear to be unreasonable."

V V

SW Bell Files Suit in Texas For Gross Receipts Taxes

It was recently reported that an offshoot of the long-standing Southwestern Bell Telephone Co. rate case in Houston, Tex., has landed in an Austin, Tex., district court.

Southwestern Bell filed suit in Austin's Ninety-Eighth District Court for recovery of $25,850 in state gross receipts taxes paid under protest on revenue the company may have to refund to Houston subscribers.

The taxes were paid on $1,059,706 in revenue collected for the quarter ending Dec. 31, 1953, pursuant to a temporary injunction obtained by Bell in a Harris County district court last November. The injunction restrains enforcement of a rate schedule adopted by the Houston City Council (TELEPHONY, Jan. 23, p. 33).

The court order permitted the company to install its own rates pending final settlement of the long dispute.

Under terms of the injunction the company must refund to Houston subscribers the difference if the final settlement establishes lower rates than those put into effect by the company.

In its suit Southwestern Bell contends it should not have to pay gross receipts taxes on revenue it may have to refund.

V V

Orders Rate Raise Held Up Until Construction Starts

The Missouri Public Service Commission on May 2 ruled that the Cassville Rural Telephone Co. could not institute higher rate schedules until completion of at least part of a $60,000 construction and improvement program.

The company had asked for rates that would increase annual revenues by about $9,825 a year. The higher rates would have facilitated borrowing money for a construction program, a company spokesman said.

But the commission decided the company must first convert its Washburn exchange to dial, and complete facilities for extended area service between its three exchanges at Cassville, Washburn and Exeter.

V V

Florida Company Told to Reappraise Rates, Charges

The Florida Telephone Corp., Ocala, on Apr. 21 was ordered by the Florida Railroad & Public Utilities Commission to check its books for the past five years and make refunds of any erroneous overcharges it discovers.

The corporation operates in 14 central and north Florida counties.

The commission said the order resulted from a Mar. 19 rate hearing at Kissimmee in which subscribers complained and the company admitted it had made some erroneous charges for a higher priced class of service than it was furnishing.

The company at that time was verbally ordered to make refunds of all overcharges in the Kissimmee area. Later it was directed to make the investigation for its whole system.

V V

Applies for Dial Rate Schedule

The Missouri Public Service Commission has received the application of the Citizens Telephone Co., Higginsville, a corporation, for authority to file a schedule of rates for dial service.

V V

Applies for Rate Revision O.K.

The Wisconsin Public Service Commission has scheduled a May 13 hearing on the application of the McFarland Telephone Co. for authority to revise its rates, rules, and regulations.

General of SW Granted 3-Exchange Rate Raise

It has been reported that General Telephone Co. of the Southwest, San Angelo, Tex., was granted rate increases in three Texas communities during the month of April.

The following increases were received in the indicated exchanges:

	Old	*New*
Booker (effective May 1):		
One-party business	$5.00	$6.50
Two-party business	4.00	5.25
One-party residence	3.25	3.85
Two-party residence	2.75	3.25
Happy (dial conversion; rates effective Apr. 6):		
One-party business	6.00	9.00
Two-party business	5.00	7.50
One-party residence	3.50	4.50
Two-party residence	3.00	3.75
Four-party residence		3.25
Olney (effective May 11):		
One-party business	7.50	9.00
Two-party business	6.00	7.00
One-party residence	4.00	4.75
Four-party residence ...	3.00	3.75

Booker, with 186 telephones, and Happy, with 213 telephones, are dial-operated exchanges. Olney is a common battery-operated exchange and serves 1,384 telephones.

V V

Maine Commission Approves Stock Issue Sale

The Maine Public Utilities Commission on Apr. 30 authorized the Van Telephone & Telegraph Co., Bethel, to issue $25,000 worth of capital stock.

The stock issuance will permit a start on conversion of the company's exchanges to dial, which would cost a total of about $100,000.

The Van company will issue 250 shares of common stock and 250 shares of 6 per cent preferred.

In another order, the commission authorized the New England Telephone & Telegraph Co. to sell, and the Somerset Telephone Co., North Anson, to buy facilities in North Anson.

The Somerset company will convert the exchange to dial and NET&T will provide extended area service to the Skowhegan-Madison-North Anson exchanges.

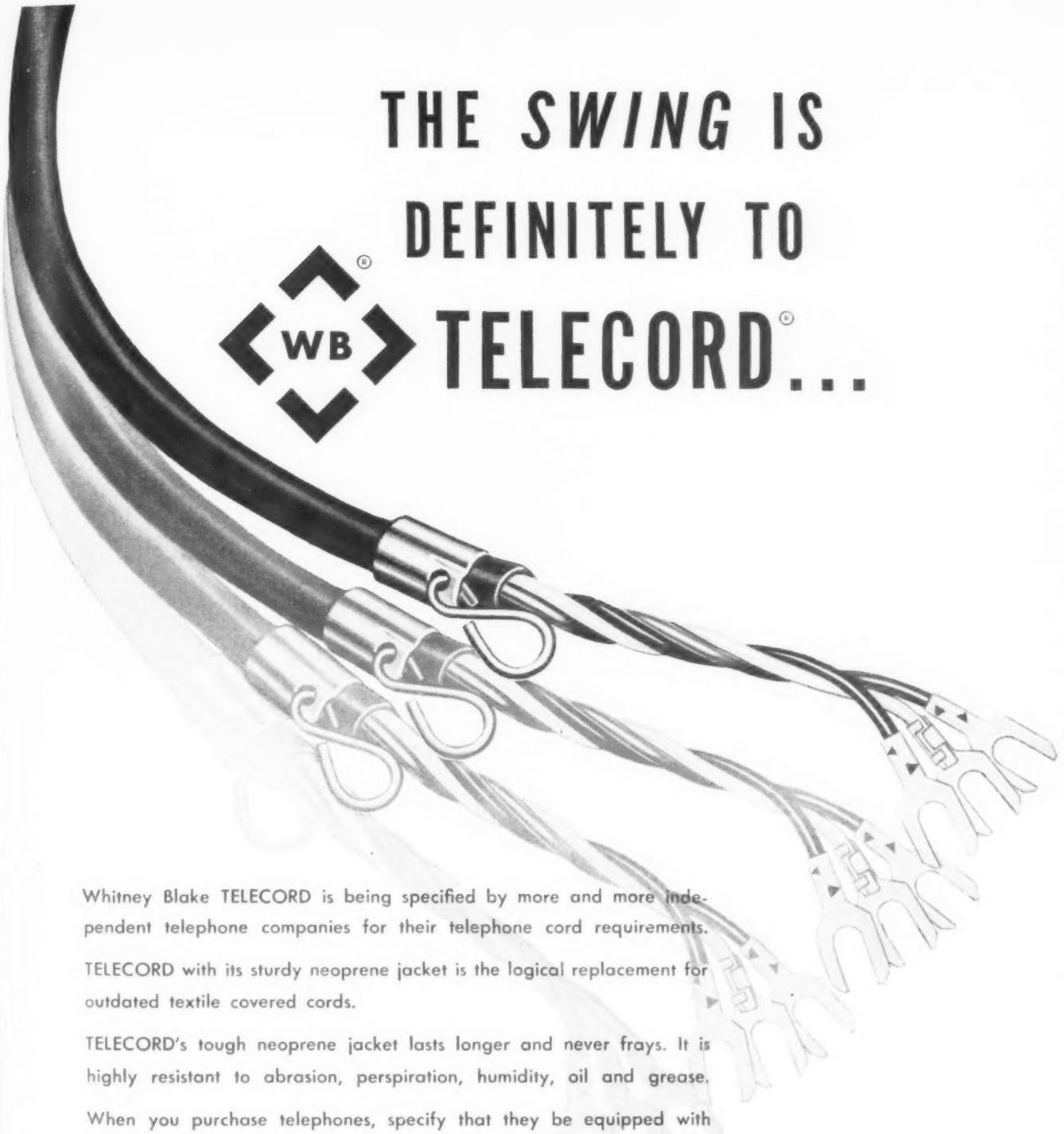
V V

Minnesota Company Granted New Rate Schedule

The Minnesota Railroad & Warehouse Commission on Apr. 28 authorized rate increases, effective May 1, for the Eagle Valley Telephone Co., Clarissa.

It was estimated the new rates would increase operating revenues from $9,774 to $10,710 and net income from

THE *SWING* IS DEFINITELY TO WB® TELECORD®...



Whitney Blake TELECORD is being specified by more and more independent telephone companies for their telephone cord requirements.

TELECORD with its sturdy neoprene jacket is the logical replacement for outdated textile covered cords.

TELECORD's tough neoprene jacket lasts longer and never frays. It is highly resistant to abrasion, perspiration, humidity, oil and grease.

When you purchase telephones, specify that they be equipped with TELECORD. On replacements use TELECORD for economy and service.

Always order TELECORD by name. Your independent telephone supply house can fill your orders promptly. Cords to fit all standard telephones are stocked.

WELL BUILT WIRES SINCE 1899

© 1954

WHITNEY BLAKE COMPANY

NEW HAVEN 14, CONNECTICUT

$160 to $1,083, yielding a return of 4.71 per cent on a plant original cost of $22,971.

The approved schedule is as follows:

	Old	New*
One-party business	$2.50	$2.70
One-party residence	1.65	1.85
Rural multi-party, company owned	1.40	1.60

*All rates to be billed monthly in advance and if not paid before the 25th of the month, there would be an additional charge of 25 cents.

V V

Illinois Company Granted Raise; Rural Improvements Ordered

The DeKalb-Ogle Telephone Co., Sycamore, was authorized on May 6 to increase its rates more than $200,000 a year in 38 communities (TELEPHONY, Jan. 30, p. 27).

The Illinois Commerce Commission said it was granting, effective immediately, the company the higher rates it asked for last Aug. 24.

The company was directed to retain free service between its Lindenwood and Rochelle exchanges and between its Steward and Rochelle exchanges. It was also ordered to reduce the number of rural subscribers out of its Mount Morris and Oregon exchanges to no more than 10 per line within 90 days.

The company won permission to discontinue all other free service between points involved in the petition.

V V

Ill. Company Asks Certificate, Stock Issue Approval

The Illinois Commerce Commission has scheduled a May 14 hearing on the application of the Leaf River Valley Telephone Co. for a certificate of convenience and necessary to purchase, reconstruct and operate a telephone system in and near the townships of Leaf River, Rockvale, Byron, Maryland, Mount Morris in Ogle County, Seward Township in Winnebago County and in southeast portions of Stephenson County, all in Illinois.

The Leaf River Valley company also applied for authority to issue 100 shares of its common capital stock of an aggregate value of par of $10,000.

V V

General of Indiana Granted Stock Sale Approval

The Indiana Public Service Commission recently authorized General Telephone Co. of Indiana, Lafayette, to issue and sell 30,000 shares of its $2.50 preferred stock of no par value at a price of not less than $50 per share (TELEPHONY, Apr. 17, p. 28).

The company was authorized to apply proceeds of the sale to repay indebtedness of $200,000 due its parent company, General Telephone Corp.; to repay $700,000 due several banks; and to provide for its 1954 construction program.

V V

Approve General of Kentucky Securities Issues

The Kentucky Public Service Commission on May 6 authorized the General Telephone Co. of Kentucky, Lexington, to sell and exchange certain securities.

The order gave the company authority to:

Sell to its parent company, the General Telephone Corp., 12,980 shares of common stock, no par value, for $700,000.

Offer the general public 30,000 shares of cumulative preferred stock, 5 per cent series, $50 par, at a maximum offering of $50 per share.

Offer stockholders two shares of the firm's new $50 par value cumulative preferred stock, 5 per cent series, and $4.00 in cash in exchange for each share of its $100 par cumulative preferred 5.2 per cent stock.

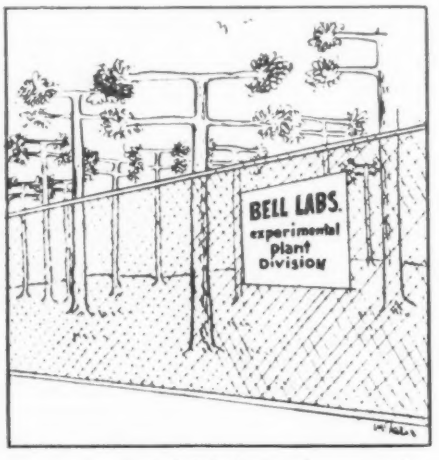
V V

Alabama Commission Approves Dial System, Rate Schedule

It was recently reported that the Alabama Public Service Commission has authorized the Ragland Telephone Co., operated by L. I. Dickinson and D. M. Fields, to construct an unattended dial system at Ragland.

The petition for authority to construct the dial system also included a proposed schedule of rates which was approved.

The charge authorized by the commission for one-party service within the base rate area is $7.00 for a business telephone and $4.50 for a residence telephone.



—Courtesy of Bell Telephone Laboratories, Inc., *Reporter*.

Carolina T&T Helps Install 2½-Million-Dollar Toll Cable

A 2½-million-dollar long distance telephone cable from Fayetteville, N. C., to Charlotte, N. C., has just been completed.

It will establish a major long distance outlet to and from eastern North Carolina, making possible additions to existing facilities between the various points.

At the same time it will make possible Carolina Telephone & Telegraph Co.'s inter-toll dial program when Charlotte, N. C., becomes a major inter-toll dial switching point next November.

Carolina T&T, in a joint project with Southern Bell Telephone & Telegraph Co., placed the cable underground from Fayetteville to Maxton, while Southern Bell carried it aerially from Maxton to Charlotte.

The cable initially will carry 72 circuits, and the addition of more carrier equipment will make it possible to increase the capacity of the cable to several hundred circuits.

V V

Indiana Company Seeks Loan Approval

It was recently reported the Indiana Public Service Commission received the application of the Indiana Midland Telephone Corp. for authority to borrow $60,000 to be evidenced by notes secured by a first mortgage.

The company also asked authority to increase its rates and charges upon conversion to dial or common battery operation, and for a certificate of territorial authority.

Another application, made by the Battle Ground Telephone Co., asked the commission for authority to transfer all its property to the Battle Ground Telephone Co., Inc.; to issue stock, and to increase its rates and charges.

V V

Indiana Company Granted Rate Relief

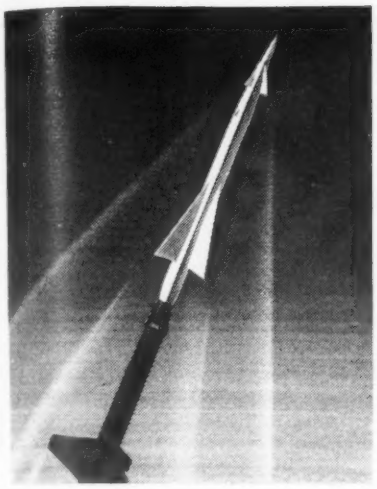
It was recently reported the Indiana Public Service Commission has authorized a rate schedule for the Craigville Telephone Co. as follows:

One-party business	$4.75
One-party residence	3.35
Rural multi-party	2.70

V V

Seeks Rate Raise in Missouri

The Albany Telephone Co. on May 6 asked the Missouri Public Service Commission for authority to increase its rates by a total of $4,929 a year.



TELEPHONE SCIENCE GUIDES A PUNCH NO ENEMY CAN DODGE

(Upper left) — Nike's missile climbs to destroy an enemy, under guidance of complex electronic controls. A radar is shown at right. Nike (pronounced Ny'kee) is named after the Greek goddess of Victory.

Is it possible to guide an anti-aircraft missile so that it will track down and destroy a rapidly maneuvering target? No one knew the answer for sure when the U. S. Army put this question to Bell Telephone Laboratories in 1945.

The special skills and techniques developed to create the nation's communications network uniquely fitted Bell scientists to answer this question. They recommended a new system, Nike, and then worked to bring it into being with engineers from Army Ordnance, Western Electric Company and Douglas Aircraft Company.

The first Nike installation has been made, and more will follow. Thus, America's defenses grow stronger through a new extension of frontiers in the communications art. It is a proud achievement of the knowledge and skills first developed at Bell Telephone Laboratories to make the nation's telephone service ever better.

BELL TELEPHONE LABORATORIES

Improving telephone service for America provides careers for creative men in scientific and technical fields

NATIONWIDE TOLL DIALING

Continued from page 24

as 20 digits to complete calls to foreign toll areas.

These cases are cited simply to indicate the range of possibilities which exist with various types of systems.

In the Centralized Automatic Message Accounting (CAMA) plan as outlined by the Bell System, or its counterpart among Independent companies, the subscriber will dial a transfer or access code to reach the ticketing equipment after which he will dial either seven or 10 digits which would again require a maximum of 13 digits. After the subscriber completes his dialing, an operator will be connected to the circuit to request the calling party's number. The operator will key into the recording equipment the calling number and start the sender which then guides the call to its destination. The automatic ticketing equipment will be required to record the toll area code where it applies in addition to the local number, and will record the proper rate for such a call so that a complete ticket including total charge can be produced.

An Independent exchange equipped for automatic toll ticketing may, of course, complete calls over its own network of trunks with conventional direct control switching equipment, but for foreign area calls, such as will be involved in nationwide dialing, some form of register sender equipment will best serve the purpose. Calls from one toll area to another toll area will, as a rule, be routed through a control switching point where facilities are available for routing calls either by direct trunks or alternate routes to any dial point connected for this service in the United States and parts of Canada.

These control switching points employ common control equipment, that is, register senders which will register the dialed number and translate where required, then retransmit the proper digits for routing the call to its destination. For such foreign area calls from the Independent exchange, the register sender equipment associated with the toll ticketing equipment will be required to register a 10-digit number as dialed by the subscriber. From the area code which has been dialed, the register equipment, with its associated translator, will cause the switching equipment to select a trunk to the control switching point, and then retransmit the original 10 digits as registered by the subscriber. The equipment at the control switching point will then control the call to its destination.

One interesting phase of this requirement exists in the following example:

An Independent toll center equipped for toll ticketing may be connected to a control switching point which is, of course, in the same toll area, but in addition may also have direct trunks to a town close-by but in another toll area. Calls to the foreign area town must always be orginated by dialing the area code plus the seven-digit number. The equipment at the originating toll center would normally route the call through the control switching point in its own toll area, but since direct trunks are available to the foreign area toll point, it is more economical to switch the call over the latter route.

Therefore, the common control equipment in the originating exchange must be capable of translating the area code, plus the local code, into a routing code which will direct the call over the most economical path. In the Bell System this process is known as "Six-digit Translation." One Independent manufacturer has termed this "Dual Code Translation"; that is, the common control equipment which records the three digits of the area code, plus the three-digit office code, is capable of disregarding the routing through the normal control switching point and will route the call via direct trunks to the nearby town in a foreign toll area.

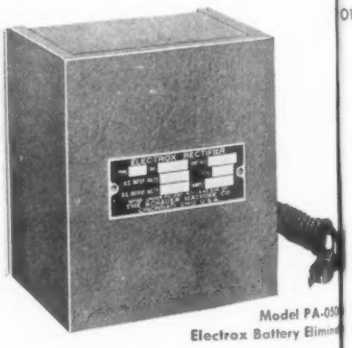
If the direct trunk group is completely occupied at the time the call is registered, the control equipment will disregard the direct route and will then select a trunk via the control switching point which in this case would be an alternate route. The sender will then be required to transmit to the control switching point the complete 10 digits as dialed by the caller since the call is outside the home toll area. Equipment to perform these functions can be supplied by Independent manufacturers.

I have described the main features of the several types of systems that will make it possible for you to expand your operations to provide this new service to your subscribers. Such provision will unquestionably result in further growth in toll traffic and revenues for the Independent operating companies.

The type of system you will choose will depend upon many factors and a careful study of all features offered is essential if you are to achieve the maximum possible returns from this venture.

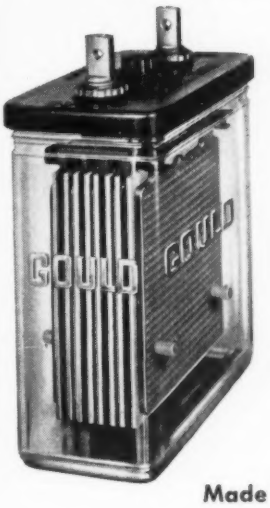
Your manufacturers will, of course, be happy to discuss your needs and make recommendations in accordance with your best interests.

The nationwide toll dialing plan is based on the principle of centralizing toll switching within a given area as determined by a careful analysis of

Construction
and
WITH THE DOUB
STROMBERG-CARLS
LEADI
24-hour guarantee
direct current, wit
electrox battery
eliminator

Model PA-05
Electrox Battery Elimin
Designed specifically for the Ope
ator's Circuit on Magneto Switc
boards, the PA-05004 type illu
trated guarantees current even
your AC fails!
When operating from 110 volt,
cycle lighting circuit, it delivers
constant, humless direct curre
If the alternating current supp
fails, a built-in Power-off Re
automatically transfers the op
ator's circuit to stand-by dry ce
Other models available for La
Signal (PBX) and Automatic (PA
systems. Products of Rectifier D
sion, Schauer Manufacturing Co

...aterials
...Supplies
...JARANTEE OF
...ND AMERICA'S
...ANUFACTURERS

the battery that lasts practically forever



gould planté

For long life and uniform dependable service, no other telephone battery equals the Gould Planté. It has rolled up amazing performance records, remaining in active full-float service for 20 years, 30 years and longer!

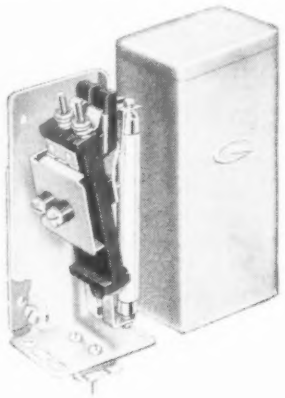
In the Planté, *all* of each positive plate is pure lead, containing *no* antimonial impurities. Thus, Gould has eliminated the primary cause of self-discharge, capacity losses and shortened battery life. Planté batteries float at constant voltage and maintain rated capacity all their life. Because they almost never need service, maintenance is negligible. If you would cut battery costs to a minimum, choose Planté.

Made by GOULD-NATIONAL BATTERIES, INC.

cook type RO

outdoor sub-station protector

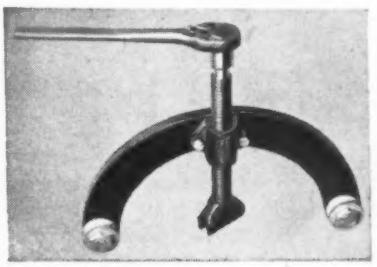
A very rugged Protector, assembled on a bracket of heavy steel—instead of porcelain—to take rough handling and subscriber abuse without danger of breakage. Other outstanding features:



1. Uses a Cook Standard Type H Protector unit with molded bakelite base for high resistance to electrical and physical shocks.
2. Protector unit contains both primary and secondary arresters. The secondary arrester provides a path to ground for lightning should the fuses be blown.
3. Mountings contain heavy studs for connecting drop wires and ground.
4. Equipped with heavy zinc weatherproof hood, and bracket for mounting on post, wall, etc.
5. All structural parts, including hood and bracket, are grounded.

ratchet handle slack puller

made by Cable Spinning Equipment Co.



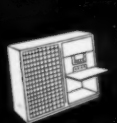
The same dependable Slack Puller, but with a ratchet added. This type of handle enables the operator to pull slack with the Little Giant Slack Puller, requiring even less effort than would be needed with the conventional model.

The correct tool for those who use the Puller day after day.

Distributed by

STROMBERG-CARLSON

ROCHESTER • CHICAGO • ATLANTA • KANSAS CITY • SAN FRANCISCO • TORONTO


High Fidelity Radios and Radio-Phonographs

Office Intercom Equipment

Electronic Carillons for Churches and Public Buildings

Sound and Public Address Systems

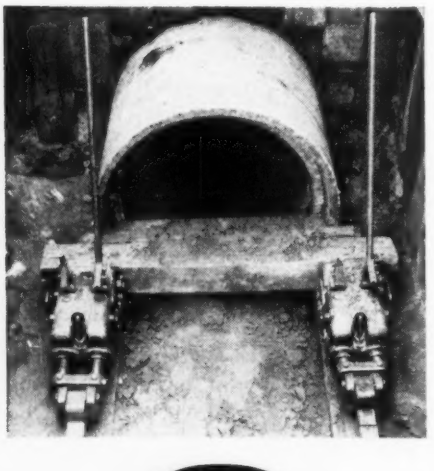
"Panoramic Vision" Television Receivers

AND MANY OTHER ELECTRONIC PRODUCTS FOR OUR ARMED FORCES

FAST, EASY WAY TO INSTALL PIPE... AT LOWER COST

PUSH PIPE UNDERGROUND WITH A GREENLEE HYDRAULIC PUSHER

Here's the simple, cost-cutting way to install underground pipe. Speed your jobs with a GREENLEE Pusher. One-man-operated, portable, simple to operate. No tearing up of pavement . . . eliminates extensive ditching, tunneling, backfilling, tamping, repaving. Cuts job time to a fraction. GREENLEE Hydraulic Pipe Pusher often pays for itself on first job. Two sizes — model shown above for pushing 3/4" to 4" pipe. Larger unit, below, for pipe over 4", concrete sewer pipe and large drainage ducts. Power pump (as shown above) also available for extra ease and speed of operation.



TOOLS FOR CRAFTSMEN
GREENLEE

Write today for descriptive literature. Greenlee Tool Co., 2065 Columbia Avenue, Rockford, Illinois, U.S.A.

local area as well as nationwide traffic patterns. Obviously this efficient arrangement will reduce the amount of toll switching equipment to a minimum and will result in maximum utilization of facilities.

It is probable that a majority of Independent companies will achieve most satisfactory results by owning their own toll ticketing equipment. However, there may be areas in which two or more Independent companies could profitably cooperate in financing and operating a single centralized toll ticketing and switching equipment to jointly serve the various offices of these companies.

In other cases, it may be possible for a large Independent company to install toll ticketing equipment and billing facilities to serve several smaller nearby Independents who cannot readily justify the investment in individually owned ticketing equipment.

All of these and other possibilities will surely receive serious consideration by the Independent industry whose traditional objective is the best in modern telephone service for its subscribers.

V V

New Graded Service Effected Following Dial Conversion

Conversion of the Harrison City, Pa., exchange to dial by the Murrysville Telephone Co., Export, has made it possible to create a new exchange and base rate area providing graded service to the customers in the Harrison City-Claridge area. This announcement was made on Apr. 26 by Harold G. Payne, president and general manager of the Murrysville company.

Mr. Payne added that the converted exchange serves 500 subscribers in an expanding residential community contiguous to Pittsburgh. The conversion cost approximately $100,000, and is the second in the company's expansion and rehabilitation program since the present management took over control of the Murrysville company and the Delmont Rural Telephone Co.

V V

Bell Labs President Wins Award

Dr. Mervin J. Kelly, president of Bell Telephone Laboratories was awarded the Industrial Research Institute's 1954 Medal on Apr. 22. The medal, established in 1945, has been presented annually since then "to recognize and honor outstanding accomplishment in leadership or management of industrial research which contributes broadly to the development of industry or the public welfare."

IN THE NATION'S CAPITAL

Concluded from page 21

the New Deal. He did not look with favor on any change, especially those suggested by the regulated utilities.

Next in line after Crosser, if the Democrats should win control of the next House of Representatives, is Representative Priest (D., Tenn.), and after him is Representative Harris (D., Ark.). Both of these have shown themselves to be more adjustable to the needs of regulated industry in seeking changes from time to time in the federal commission laws.

Another primary casualty of interest to the utilities occurred in Alabama. In that state, the chairman of the Alabama Public Service Commission, C. C. (Jack) Owen, was making a run for governor. The victor in the Democratic primary in Alabama, of course, is automatically conceded election. But the victor happened to be James (Kissing Jim) Folsam. He ran so far out in front that no run-off will be necessary. Owen did not run "in the money" anyhow.

The point of interest in all this was Owen's recent statement as chairman of the Alabama commission in turning down the rate increase request by Southern Bell Telephone & Telegraph Co. As noted in this department (Apr. 24), Owen gave the telephone company a dressing down for even attempting to get another rate increase and he made some remarks about the Alabama Supreme Court upholding a former rate increase (1949) over the head of the Alabama commission. There are probably some cynical persons who might have thought Owen was running for governor when he issued that statement. But it is all over now anyhow.

V V

REA Has New Short Cut For Rural Telephone Loans

The U. S. Department of Agriculture on Apr. 28 announced a new pre-loan procedure to expedite the processing of federal REA loans to extend and improve telephone service in the rural areas of America.

REA Administrator Ancher Nelsen stated that the key to the change is a new standard contract for engineering services which REA recommends for use by applicants for loans.

The new procedure combines into a single engineering study a number of different engineering steps which have proven time-consuming to telephone organizations which had applied for loans to provide modern service in rural areas.

Under the new contract, consulting engineers will complete the fundamental engineering studies before the REA loan is made. Such a procedure is expected to shorten materially the time required for REA to process loans and to advance construction funds to borrowers. It was adopted after being discussed with and endorsed by a recent conference of consulting engineers in telephone plant construction from all parts of the country.

V V

Motor Vehicle Fleet Manager Employed by General System

General Telephone System has employed Claude W. Stewart as system fleet manager, according to a recent announcement by Donald C. Power, president of General Telephone Corp.

Mr. Stewart will make his headquarters at the service corporation office in New York, but will spend a great deal of his time initially with the various companies within General Telephone System developing and coordinating the purchase, maintenance and operation of motor vehicles within the system.

Mr. Stewart is a graduate of Annapolis and holds a Bachelor of Science degree in electrical engineering. He has spent a great part of his life with the United States Navy in an industrial engineering capacity, developing methods for operating different Naval bases and shops.

Mr. Stewart commenced his assignment in New York on Apr. 26, reporting directly to Thomas A. Boyd, senior vice president. It is anticipated that within a very short time he will be visiting the various system companies to review personally their vehicle operations.

V V

Bell of Canada Tells Plans for Canadian Microwave Network

It was recently reported that work in Canada is now under way on construction of a Toronto-to-Winnipeg microwave radio relay network to provide additional communication facilities between eastern and western Canada.

The Bell Telephone Co. of Canada has announced that the over-all network, which will be completed late in 1956, will comprise a line of some 45 radio relay towers placed over more than 1,200 miles from Toronto, through North Bay to Winnipeg.

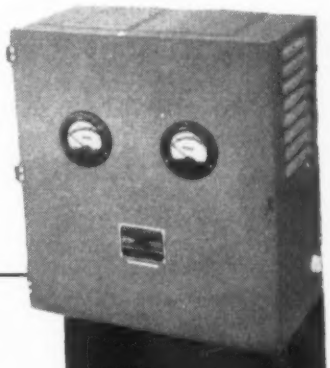
V V

Mirth is God's medicine. — HENRY WARD BEECHER.

RAYTHEON RECTICHARGERS®
(Battery Chargers)
HELP PROTECT UTILITY POWER LINES

The same dependable RectiChargeRs, so widely used throughout the Telephone Industry, help guard your community against power and light failure. Operating unattended in remote sub-stations, they charge the batteries which operate circuit breakers — help guard power lines against lightning surges, provide circuit protection during storms and other emergencies.

Power companies prefer Raytheon RectiChargeRs for the same reasons you do . . . because they are fully automatic — maintain constant voltage output over the complete load range — follow the load and compensate for wide input changes — never overcharge or undercharge — contain no tubes or moving parts to wear out — require routine inspection only once or twice a year.



RAYTHEON®
Excellence in Electronics

RAYTHEON
MANUFACTURING COMPANY
EQUIPMENT SALES DIVISION
DEPT. 6270-T, WALTHAM 54, MASSACHUSETTS

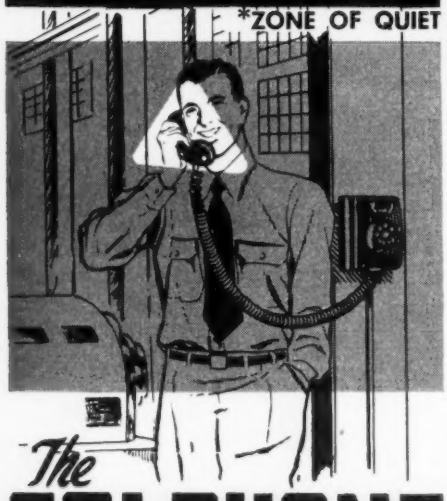
DISTRICT OFFICES: BOSTON, NEW YORK, CLEVELAND, CHICAGO, NEW ORLEANS, LOS ANGELES (WILMINGTON), SAN FRANCISCO, SEATTLE
INTERNATIONAL DIVISION: 19 RECTOR ST., NEW YORK CITY

RAYTHEON PRODUCTS INCLUDE: RectiChargeR* battery chargers; RectiFilteR* battery eliminators; Voltage stabilizers (regulators); Transformers; Tubes and other electronic equipment.

*Reg. U. S. Pat. Off.

Specify Raytheon RectiChargeRs and RectiFilteRs for completely dependable Telephone service. Your supplier offers a complete line for all requirements. Ask him for details or write direct.

the PHONE with * THE Q-ZONE LICKS NOISE!



The GAI-PHONE ELECTRONIC TELEPHONE

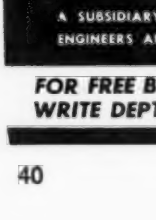
MAKES COMMUNICATION POSSIBLE IN EXTREMELY NOISY AREAS

Providing dependable telephone service into and from noisy areas *without sound-proof booths*, the GAI-PHONE is operated and connected like a conventional telephone. Designed for dial or manual operation, desk-top or wall mounting, it can be mixed with conventional telephones in the same system. The adjustable transmitter and receiver levels, as well as the adjustable side-tone level, not only assures the greatest operating comfort in noisy areas, but makes the GAI-PHONE very effective over long lines *without repeaters*. Rugged trouble-free design assures long life.

Designed for wall or column mounting, this model can be used in many noisy locations where a sound-proof booth is not only undesirable but impractical. For example, when equipped with retractile cord (illustrated) and installed on Boiler Control panel, operator's freedom of action and effectiveness are increased greatly.

MODEL 200

MODEL 100



Combining all of the GAI-PHONE'S operational features with modern, streamline design makes this model ideal for desk or table top installation.

GAI-TRONICS CORPORATION
READING, PENNA.

A SUBSIDIARY OF GILBERT ASSOCIATES, INC.
ENGINEERS AND CONSULTANTS

GAI

FOR FREE BOOKLET WRITE DEPT. TP

Some of the consulting engineers, REA officials, and Grand River Mutucl Co. directors and representatives who attended the recent meeting on company construction plans, were (back row, left to right): MORRISON NEELY, HUGH O'HARA, EDWARD MADDOX, MARION L. CRIST, FRANK LUFF, VERNON L. FREEMAN, L. S. WOOLSEY, WILFRED SELBY, VENE MILLER and EMMETT WILEY. Middle row: E. E. ANDERECK, RUSSELL PICKETT, BAKER ATTERBURY, LOWELL MOORE, WILLIAM J. NICHOLS, CLAYTON SHELTON, ROLLIN RYAN, ARNOLD LOVETT, C. W. CHASTAIN, A. B. SMITH. Front row: EVERETT MAY, RALPH E. PARKER, HARRY JOHN, CLARENCE RATLIFF, J. R. LOWRY, RAY BARNETT, MAURICE HEIN, HARLEY LEAZENBY.

Large REA-Financed Mutual Plans Dial Service for 11,000

The Grand River Mutual Telephone Corp., Princeton, Mo., one of the nation's largest mutuals using Rural Electrification Administration financing, concluded construction plans at an Apr. 14 meeting with consulting engineers, REA officials, and company directors and representatives. Present plans call for construction to start within the next few months on the system which will ultimately bring modern dial telephone service to 11,000 rural families living in 11 counties in northwestern Missouri and southwestern Iowa. Many of the families to be served are presently without telephone service of any type.

Involved in the company's plans will be the construction of approximately 2,700 miles of pole line and cable and the installation of 23 automatic dial central offices. The company expects to render dial service exclusively.

C. W. Chastain, company manager, said following the meeting: "It has taken a long time to complete our planning, but we are ready now to begin rebuilding every foot of plant, replacing every telephone, all the central office equipment, and almost all the buildings, and doing it just as rapidly as possible."

Mr. Chastain referred to the existing telephone plant which was acquired from the Middle States Utilities companies of Missouri and Iowa, and the Galt & Laredo Telephone companies as well as plant to be acquired from Chula Telephone Co., Half Rock Telephone Co., Ravanna Telephone Co., Hatfield Telephone Co., Eagleville Telephone Co. and Terry Telephone Co.

Under the plan approved for construction, eight-party rural service would be available in the smaller exchange areas for $3.50, and in the larger exchange areas for $3.75, subject to commission approval. The same classes of service found elsewhere would be available at the heavier population points.

The events leading up to Grand River's planned construction were told by J. R. Lowry, corporation president.

"Almost as soon as Congress passed the law making funds available for rural telephone improvement in 1949, I was approached by my friend, Harley Leazenby of Mt. Moriah, and asked to help promote a company which would bring good telephone service to the area. We determined early in 1951 that the rural people in the area were very much interested in telephone service, and that no large private company was either able, or interested, in providing this service.

"At this time we were thinking primarily in terms of improving telephone service in Mercer County and Grundy County exclusive of Trenton which is served by Southwestern Bell Telephone Co. A board of directors was named for the new organization which was set up by our attorney. . . .

"The original directors' names were, in addition to Leazenby and myself, Clarence Ratliff, Trenton; Harry John, Ridgeway; Ralph E. Parker, Trenton; Maurice Hein, Spickard; Everett May, Harris; Ray Barnett, Princeton, and Rollin Ryan, Powersville. Since then Clayton Shelton, Lineville, Iowa; and Arnold Lovett, Garden Grove, Iowa, have been added. Of the directors originally selected, all are still serving on the board."

THE THIRD MEDIUM

Continued from page 19

Thus, circuit length economy must compromise with performance standards in wire line carrier systems.

The top section of *Fig. 3* shows transmission loss for a typical microwave circuit. Fading in a microwave system corresponds to wet weather or sleet conditions on a wire line. Fades are caused by atmospheric conditions and are generally greater over water than over normal land terrain. Thus, a deep fade over an overwater path corresponds to the high losses on a sleet coated open wire line.

Even over favorable terrain, the transmission loss during fades is a substantial variable. This is considered in system planning by using equipment with good level regulation and with adequate gain reserves.

Luckily, the microwave art possesses an ideal inert amplifier in its antennas which focus and beam the transmitted energy in one direction only. Without the effective gain provided by directional antennas, the very high space loss at microwave frequencies would require radio transmitter powers far in excess of those used in many commercial standard broadcasting stations.

With 10-foot parabolic antennas at each end, for example, the 900-mc microwave energy will be received as if the transmitter power equals 500 kilowatts, yet only 5 watts of power are actually fed into the transmitting antenna from a moderately sized conventional vacuum tube.

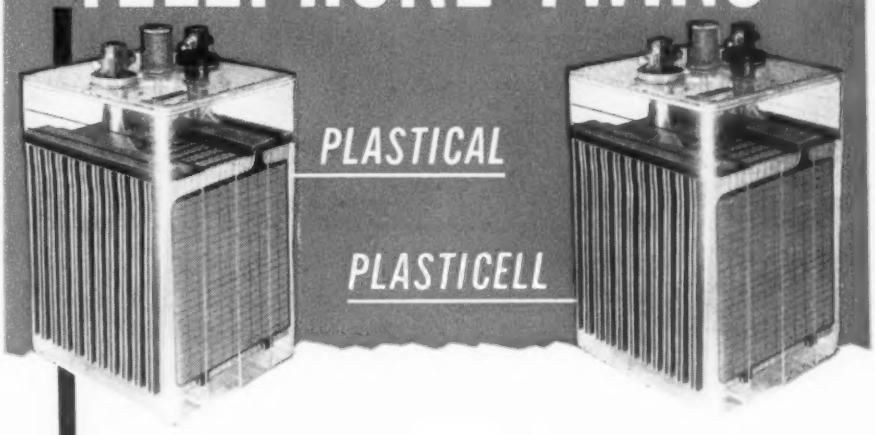
Thus—despite the numerically much higher transmission losses involved—microwave equipment can be designed with power amplifiers and receiving gain circuits not drastically exceeding the effort required for open-wire-line carrier systems.

Compared to open wire and microwave, cable-carrier transmission is less subject to extreme departures from the fair weather condition. This advantage is somewhat offset by the higher attenuation rate per mile, requiring repeater installations at frequent intervals.

Cable carrier repeaters can be smaller and cheaper than open wire carrier or microwave repeaters for comparable channel capacity. Such factors will tend to encourage multichannel exploitation of existing cable routes of moderate lengths.

Where new transmission media are needed, the heavy investment in outside plant and the maintenance along the right-of-way may often turn the deci-

MAKE YOUR NEXT BATTERY
ONE OF C&D's
TELEPHONE TWINS



To meet your telephone battery needs you can find the answer in one of C&D's "Telephone Twins"—PlastiCal and PlastiCell.

For maximum life—estimated at 25 years—specify C&D PlastiCal, our lead-calcium type. For conventional or normal installations, specify C&D PlastiCell, our standard telephone battery. Both are specifically designed for telephone service and both give you:

1. Extra-long life
2. Triple insulation
3. One-piece plastic case
4. C&D's patented Saftee Vent
5. Plastite Post Seals

C&D batteries for the telephone industry are available through your equipment and supply distributor. Consult him, or write us for Bulletins T-527 (PlastiCell) and T-528 (PlastiCal).

C&D BATTERIES, INC.
of Conshohocken, Pa.

SALES AND SERVICE OFFICES IN PRINCIPAL CITIES FROM COAST TO COAST

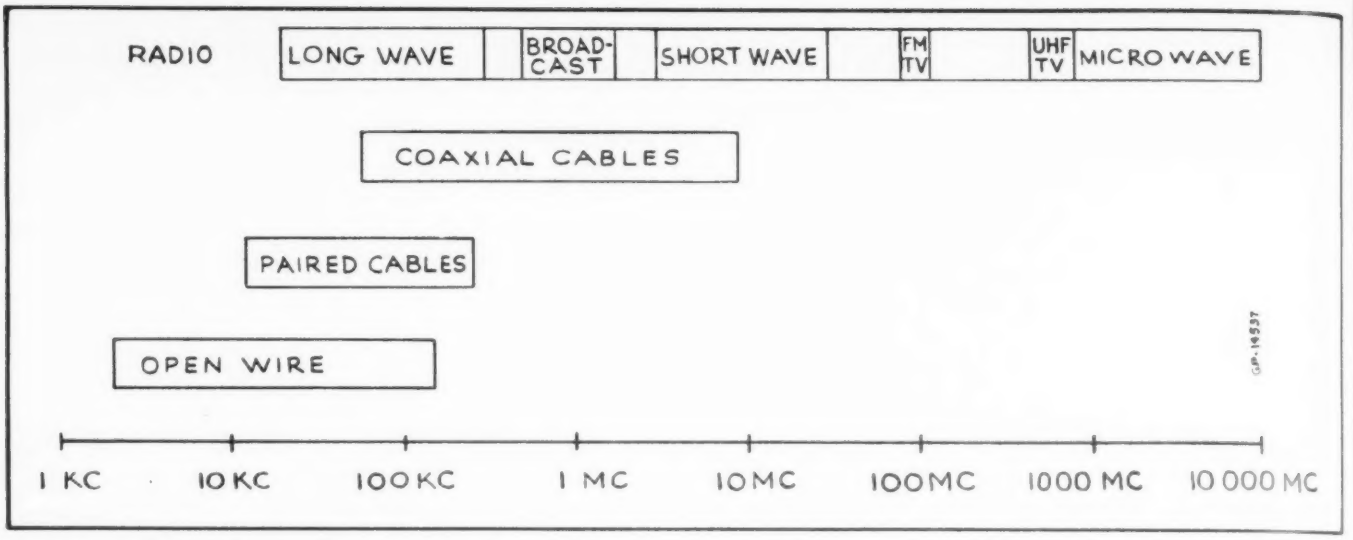


Fig. 4. Range of frequencies presently employed in carrier telephone systems as compared to the frequency spectrum used for various radio applications.

sion against both cable and open wire in favor of microwave.

Plant Expansion Without Pains

Reviewing the multi-channel facilities which are now available to the growing toll plant, one is struck by a fundamental change since the days of the first single and three-channel carrier systems. No longer is the approach one of occasional extra usage of the voice-frequency facility; rather, the carrier-frequency plant becomes the logical norm.

There is even evidence of complete abandoning of physical channels; elimination of physical circuits on carrier equipped cables as a consequence of unloading for carrier use is one example. Characteristic of this development is the growing concentration in terminal and repeater plant investment.

With a choice of facilities, both under and above the ground, and across free space, there is potentially a carrier system for every toll need. The family of carrier systems has benefited from years of progress shared by the wire-line and radio communication industries.

How obvious this inter-relationship can be is demonstrated by *Fig. 4* where over-all ranges of operating frequency are indicated for telephone carrier and for radio transmission.

It would be difficult to identify carrier as distinct from radio by frequency alone since the wide overlap is also evident in the similarity of circuit design and components. Unquestionably some techniques change at microwave frequencies, and even between the low and high limits of microwave; but the change has the character of organized evolution, retaining the symbols and functions of the lower frequency circuit equivalents.

Logical and organized growth, rather than novelty and obsolescence, is the driving force in carrier communications. The old facilities remain in service, are used more, and produce more revenue, while newer facilities allow bolder steps of expansion.

In some instances new microwave systems provide additional channels on toll routes where the original open wire lines still stand (although most likely they are now carrier equipped).

It appears safe to say that our technological age has few parallels for so much applied progress without tearing down and junking the old.

V V

"No one would be happier than Soviet Russia if the Catholics, Jews and Protestants of the United States could be brought to hate and distrust one another. It is a foremost objective of the Communists to stir up antagonisms and sow seeds of discord among the major religious groups."—Montpelier (Vt.) *Evening Argus*.

AVOID STATIC DISCHARGE WITH KEARNEY NON-STATIC GROUND WIRE CLIPS

You need never be bothered with complaints about static caused by gaps between the ground wire and clip. Even if this tight-gripping clip loosens in the wood, it will remain tight around the wire indefinitely.

Kearney Non-Static Ground Wire Clips are inexpensive to use, quick and easy to install.

Specify KEARNEY PRODUCTS

JAMES R. KEARNEY CORPORATION
4224-42 Clayton Ave., St. Louis 10, Missouri

229

For Better Construction-For Safer Maintenance

THE OPERATOR'S CORNER

Concluded from page 26

It is true, the years take their toll on our bodies. But if we can maintain a young outlook on life, making it interesting and zestful, we are not conscious of the fact that we are growing old or older as the years roll on. Being "age conscious" is disturbing, particularly in associating with younger people. But if you make an effort to be young with them (not foolishly, of course), they will accept you as a welcome member of their group.

A couple I am privileged to know always have a welcome mat out for the neighborhood young folks who consider it a treat to spend an evening with Roy and Shanty (the wife's nickname), where hospitality reigns supreme.

Time may make your knees creak, your hair gray or your pate bald; it may make steps grow steeper and hearing less acute. But if you are able to maintain a young outlook on life, a sense of humor, and an interest in present day activities and life in general, you will not be considered too old to mingle with a younger group.

They will welcome you as they do Roy and Shanty. And believe me, enjoying the company of young folk is a lot more fun than sitting around thinking about your physical handicaps and bemoaning the fact that "Old Father Time" is creeping up on you.

Traffic Questions

(1) If a CLR operator encounters NC over tandem trunks or over circuits to an intermediate office (dial or ringdown), how many additional attempts should be made, and at what intervals, before giving the NC report and releasing the customer?

(2) When do you reach the UTX operator?

(3) How can you recognize this condition?

(4) After word has been left on a call, where should the ticket be sent?

(5) When a called party reports ready to talk on an inward call, if the customer volunteers any calling details to the TTC operator, should they be accepted and passed to the OTC?

Answers are presented on page 44.

V V

Peace is liberty in tranquillity.—CICERO.

V V

We cannot all do all things.—VIRGIL.

Anyone can install

FLEXIDUCT

It's the new rubber floor duct that solves over-floor wiring problems quickly and effectively, with adequate protection from sweepers, mops and equipment on casters. Installation is easy and permanent. You just fasten Flexiduct in place with its own special cement. There's no drilling or necessity to use screws and fasteners. Flexiducts' flexibility allows it to adhere evenly and securely to all types of floor surfaces and it is adaptable for installations ranging from 2 conductors to 25 pair switchboard cables.

Export Agents | Ericsson Telephone Sales Corp.
100 Park Ave. New York 17, N.Y.

Write for circular 154-A

BUCKEYE TELEPHONE & SUPPLY CO.

1250 KINNEAR RD. COLUMBUS 12, OHIO

KLEIN

Quality you can count on—FOR SAFETY...

FOR SERVICE

Yes, safety and service are the two big reasons why Kleins are the choice of the man on the pole. Look for the familiar Klein trade-mark on pliers and climbers, safety straps and belts, lag wrenches and grips. It has been a trade-mark of quality "Since 1857."

ASK YOUR SUPPLIER

Foreign Distributor: International Standard Electric Corp., New York

Write for your free copy of the Klein Pocket Tool Guide today!

"Since 1857"

Mathias KLEIN & Sons

Established 1857 — Chicago, Ill., U.S.A.

3200 BELMONT AVE., CHICAGO 18, ILL.

Six More TV Stations Linked to Bell Network

Six more television stations have been connected to the Bell Telephone System's nationwide network of television facilities since the Apr. 24 weekend. They are: WDEF-TV, Chattanooga, Tenn., WHO-TV, Des Moines, Iowa, WSEE-TV, Erie, Pa., WRBL-TV and WDAK-TV in Columbus, Ga., and KGLO-TV, in Mason City, Iowa.

The Long Lines Department of the American Telephone & Telegraph Co. said network programs reach Chattanooga by radio relay via Atlanta and are received in a local telephone building. The Southern Bell Telephone & Telegraph furnished an intra-city link to carry the programs from the telephone building to WDEF-TV's studio.

Network programs for WHO-TV are transmitted over the transcontinental radio relay route which passes through Des Moines. Local connection between the telephone building and WHO-TV was provided by the Northwestern Bell Telephone Co.

WSEE-TV, Erie, Pa., receives network service from the Buffalo-Cleveland communication's route. The local connection there between the telephone building in Erie and the station's studio is by video cable. These facilities were furnished by the General Telephone & Telegraph Co. of Pennsylvania in cooperation with The Bell Telephone Co. of Pennsylvania.

Long Lines said network service was extended to Columbus, Ga., over a newly built radio relay branch from Omaha, Ala., on the Atlanta-Jackson communications route. The Southern Bell Telephone & Telegraph Co. provided the local channels from the Columbus telephone building to the stations' studios.

KGLO-TV was connected for network service via the Des Moines-Minneapolis communications route which passes through Mason City. The local channel was provided by the Northwestern Bell Telephone Co.

Long Lines said these interconnections make network television service available to a total of 299 stations in 189 cities in the United States.

It was also reported that Bell Telephone System plans for a new radio relay route to give North Dakota its first network television were made public on May 4 in an application filed with the Federal Communications Commission.

The Long Lines Department of American Telephone & Telegraph Co. said the proposed route would stretch some 227 miles from Minneapolis to Fargo, N. D.

The new facilities would be used initially to extend network TV service to the Fargo area with a service date of about Oct. 1. Later, telephone service channels would be added to the route.

The projected communications system would include seven intermediate microwave stations, with antenna towers ranging in height from 125 feet to 275 feet. Such stations relay the super-high frequencies called microwaves that are used in the radio relay method of transmission.

V V

Operator Saves Two Lives, Awarded Vail Citation

Miss Patricia A. Dunleavy, an operator in the Scranton office of the Bell Telephone Co. of Pennsylvania, recently was accorded an honorable mention citation by the committee of awards, Theodore N. Vail Memorial Fund.

The citation recognized her "prompt and efficient action on Mar. 7, 1953, in obtaining the services of a doctor for two persons overcome by gas which resulted in the possible saving of two lives."

V V

"The first sign that a nation is entering a period of deterioration is when the people begin to depend on the government for everything. The willingness to do for themselves has been an American tradition, but of late years we have seen the nation, the state, the community look to the government to help in everything." — KNOXVILLE, IOWA, *Express.*

Answers to Traffic Questions On Page 43

(1) Make two attempts at approximately 5 and 10 minutes before releasing the calling line and sending the ticket to the TX.

(2) Occasionally when dialing a distant TX operator you may reach the UTX operator. This is possible when all trunks to the TX operator at the TTC are busy and the equipment is arranged in such a way that the TX signal automatically overflows to the UTX operator.

(3) You will recognize this condition by the answering phrase used, "Universal TX."

(4) All tickets on which word has been left should be sent promptly to the TX position.

(5) Yes.

N. C. Company Arranges Construction Financing

It was recently reported that the Matthews (N. C.) & Waxhaw Telephone Co. has arranged financing of $400,000 with New York investment companies in order to carry forward a construction and development program for the next three years.

The company will use the funds mainly for construction of a new plant to serve additional subscribers in its territory, for additional central office equipment at its Matthews and Waxhaw exchanges, and for the establishment of a new exchange.

The central office equipment will be additions to the company's present facilities, including the installation of facilities to handle nationwide inter-toll and customer dialing based on a universal numbering plan. The company connects with the nationwide inter-toll dialing plan through Southern Bell Telephone & Telegraph Co. at Charlotte.

Financing of the program has been arranged by the Chase National Bank of New York City and the Stromberg-Carlson Credit Corp. of Rochester, N. Y.

The Matthews & Waxhaw company serves a large area of east, northeast and southeast Mecklenburg County, and west and southeast Union County, including the towns of Matthews, Waxhaw, Mineral Springs, Weddington, Stallings and Indian Trail, N. C.

V V

Every 45th Family in U.S. Received AT&T Dividend

One in every 45 families in the United States received a dividend check from the American Telephone & Telegraph Co. on Apr. 15 as the company completed its 33rd year of consecutive dividend payments.

AT&T share-owners now total 1,293,000, the company announced, and the dividend checks will be sent out to more than 19,000 communities throughout the country.

Most of the people who own AT&T stock are small investors. In fact, more than a half million of them own 10 shares or less.

Also there are thousands of other small investors represented in the AT&T stock owned by institutions such as life insurance companies.

The number of shares has more than doubled since the end of World War II —from 20 to 45 million—enabling the telephone industry to grow and keep pace with the increasing demands for communications. Because of the substantial increase in the number of shares, this most recent dividend payment, for the first time in the company's history, totaled more than 100 million dollars—a record contribution to the nation's progress.

V V

Bluefield (W.Va.) Company Names Johnson Commercial Manager

J. E. Johnson recently was appointed general commercial manager of the Bluefield (W.Va.) Telephone Co., according to an announcement by H. J. Huether Jr., president.

Mr. Johnson was transferred from General Telephone Co. of Indiana, another subsidiary company within the General Telephone System.

Mr. Johnson joined the General system in January, 1947, as a group commercial supervisor, having previously been employed by Michigan Bell Telephone Co.

Early in 1950 he was made southern area commercial manager and, during the latter part of 1950, he was moved into the rates and tariffs department as an engineer.

At the time of his recent appoint-

You can string Amertel twice the distance possible with regular BB wire! Amertel is 2½ *times stronger.* You can span rivers instead of building expensive pilings. You can cut across curves instead of following roads. Experience shows Amertel 135 cuts pole, hardware, installation, and maintenance costs in half. Write or call our nearest warehouse now for prices.

Recommended and Sold Through Our Distributors

AUTOMATIC ELECTRIC

Distributors in U. S. and Possessions: AUTOMATIC ELECTRIC SALES CORPORATION
Export Distributors: International Automatic Electric Corporation
1033 West Van Buren Street, Chicago 7, U. S. A.

ment, he was working with the rate group in the preparation of studies for presentation to the Indiana Public Service Commission.

V V

Gary Co. Reports Common Stock Almost Totally Subscribed

Theodore Gary & Co. recently announced that at the expiration of the company's subscription offer on May 6, it had received subscriptions totalling over 146 per cent of the 310,000 additional shares of participating common stock offered by the company to its stockholders.

Over 98 per cent of the shares offered were taken up under the primary subscription rights, and over 48 per cent were subscribed for under the additional subscription privilege.

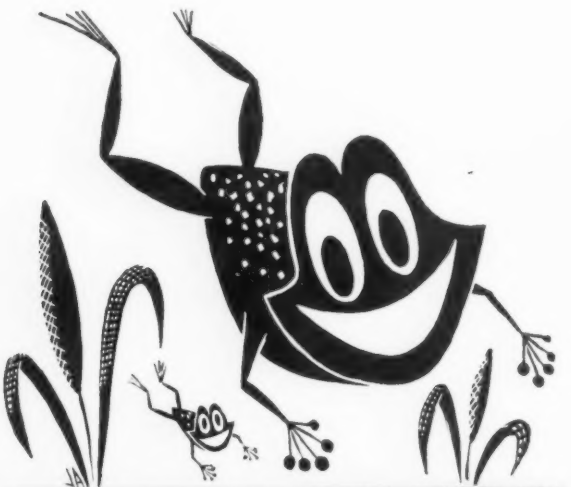
In view of the substantial exercise of primary rights there would be only about 4,400 shares available for allotment under the additional subscription privilege.

The issue was not underwritten, but subscriptions for the new stock were solicited by a group of dealers under a dealer manager arrangement.

V V

The noblest motive is the public good.—VIRGIL.

Employes of Wautoma and Westfield exchanges of the Community Telephone Co. of Wisconsin, shown assembled for service pin awards. Special gold pins, showing the name of the company, the year for each five years of service, and set with a small blue enameled telephone were awarded to many that were in attendance. Employes who received service pin awards have a number following their name indicating their service pin award. Front row (left to right): LILA PATTERSON (5), EVELYN KNUTSON (10), JANETTE KREUGER (15), FRANCES TESKA (5) and EDITH GREENE (5), all of Wautoma. Middle Row: MILDA BOHN of Westfield, LORETTA FITZGERALD of Wautoma, LEONA GROSKREUTZ, SHIRLEY HINTZ and HERTHA SCHWANKE of Westfield, DOROTHY KENGOTT and PEARL WEBER of Wautoma, THERESA LEMKE and DOLORES KEMNITZ of Westfield. Back Row: HERBERT WEBER (10), ARTHUR BURSACK and WILLIAM NORK of Wautoma, LLOYD LIPPERT (10), of Westfield; DONALD PARSONS, district manager, of Walworth; B. F. STALTER (20), general plant superintendent, and B. H. PIEPMEIER (25), general manager of the general office in Black River Falls.



SMALL OR LARGE

You can rest assured that your directory,
whatever its size,
will be carefully printed at
The Lakeside Press
R. R. Donnelley & Sons Company
350 East Twenty-second Street, Chicago 16

WHAT COMMUNICATION WORKERS NEED TO KNOW ABOUT

Electricity . . .

Second Edition
Just Published

The communications worker who needs reliable, quick knowledge of fundamentals of electrical engineering has in this book all the explanations, illustrations, and applications of electricity he needs in his job. *The explanations and illustrations are taken from the communication field itself*—from telegraphy, telephony, radio and television.

THE ELECTRICAL FUNDAMENTALS of COMMUNICATION

• by Arthur Lemuel Albert
Professor of Communication Engineering, Oregon State College
Second Edition, 531 pages, 6x9, 363 illustrations $7.00

WRITTEN expressly for radio men, telegraphers, telephony engineers, this book gives fundamentals of electrical engineering accurately, simply, from the point of view of the communication industry. It gives you fundamentals of electronics . . . explains what you need to know about direct current, conductors, resistors, and insulators; discusses such topics as the magnetic field, sources of electric energy, induction, motor and generator action, magnetic hysteresis, eddy currents, and many others. You will find sound, basic information that will help you know and understand electricity.

The Second Edition includes new AIEE and IRE standards and current usage . . . gives additional emphasis to radio fundamentals, making it more useful to those interested in electronic, radio, and television fields.

Order From
TELEPHONY PUBLISHING CORP.
608 S. Dearborn St. Chicago 5, Ill.

BOOK REVIEW

"ELECTRONICS," by George F. Corcoran and Henry W. Price, 459 pages. Price $7.00.

In this new text, published in April, the authors effect a balance between electron-tubes and transistors on one hand, and the associated circuitry on the other.

With emphasis on the circuitry aspect of the subject, the authors also have included a comprehensive treatment of the basic physical principles of electronics. Their discussions cover mobile charges; the vacuum diode, triodes, and pentodes; linear operation—Class A; non-linear operation—Classes A and B; feedback circuits; gas-filled tubes and associated circuits; germanium diodes and transistors, and oscillators.

As an aid to understanding feedback circuits and oscillators, Messrs. Corcoran and Price have included the concept of return voltage ratio, with Nyquist plots of return voltage ratio employed as the criterion for stability of active electrical networks. Situations where the gain-bandwidth product remains fixed are considered.

Professor and chairman of the department of electrical engineering at the University of Maryland, Mr. Corcoran is also the author of "Basic Electrical Engineering," published in 1949, and co-author of three other books on electrical engineering. Assistant professor in the same department, Mr. Price is also a consultant to the Naval Ordnance Laboratory at Silver Spring, Md.

This book may be purchased through TELEPHONY.

V V

"The businessman who blocks the play of natural forces in the market economy commits an act of sabotage against the free enterprise system as truly as does the subversive enemy agent whom he abhors."—CLARENCE B. RANDALL.

PLAN

"The 'positive program' that business needs from government today is not a program of new forms of intervention but a program for the restoration of the freedoms and incentives that spell true liberalism. Fortunately, our own government is moving in that direction." — Excerpt from *The Guaranty Survey*, published by Guaranty Trust Co. of New York.

Plan Braille Transcription Of City Telephone Book

It was recently reported that one of the most prodigious jobs ever undertaken by a volunteer organization will soon be attempted by a Peoria, Ill., Lutheran women's group. The project is the transcribing of the Peoria telephone book into Braille.

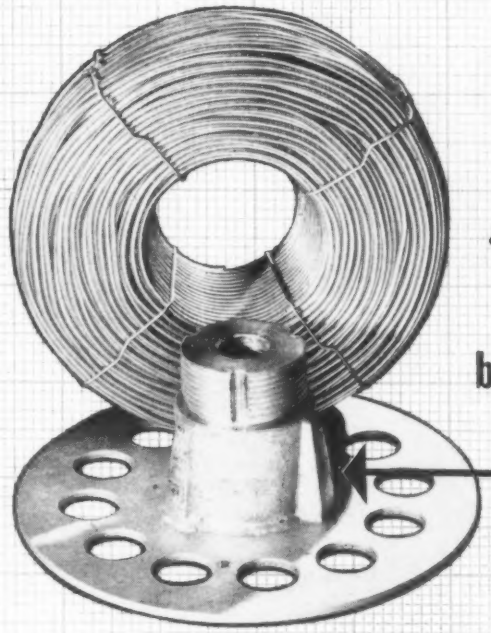
Workers from three churches will spend at least six months at the task and will use 4,000 pages of Braille sheets to transcribe 196 white pages of the telephone book.

The Braille telephone book will be used by Peoria blind citizens who requested it for use in a fund campaign they are undertaking for their association. The blind association seeks to construct a building for a headquarters and hopes to raise the funds through solicitations by the blind members.

The members want to have a special telephone book rather than asking Information for the number, because they want to depend on themselves.

It is believed that this will be the first time the telephone book of a large city has ever been transcribed into Braille.

Why the Hub is Tapered!

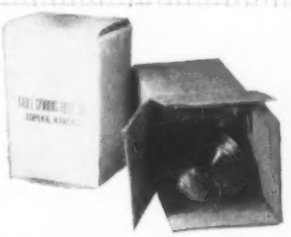


Lashing Wire Coiled to Fit Taper

Taper Formed by Easy-to-Modify Lugs

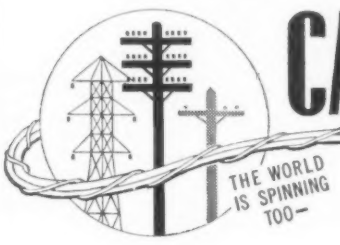
● The illustration shows how the hub of the Neale Spinner wire spool is tapered and how Neale lashing wire is coiled—so it will fit on this tapered hub *only the right way.* This design prevents reverse pay-out and back-lashing, and is your assurance of fool-proof operation.

Though not recommened, it is easy to modify lugs for wire coiled on straight hubs.



FOR BEST RESULTS ...use Neale lashing wire, coiled to fit the tapered hub. Every type and quality available.

See Your Jobber



CABLE SPINNING

Equipment Company PHONE 2-7234

3100 TOPEKA AVE. TOPEKA, KANSAS

ENDURPRENE
• DROP • BRIDLE
PREMIUM GRADE INSULATION —
— TOUGH, ENDURING NEOPRENE JACKET
A COMBINATION HARD TO BEAT FOR LONG-RUN ECONOMY AND RELIABILITY
DISTRIBUTED BY KELLOGG SWITCHBOARD AND SUPPLY COMPANY
MANUFACTURED BY
GENERAL INSULATED WIRE WORKS, INC. PROVIDENCE, R. I.

Christenson Named Methods Analyst for General System

It was recently reported that Robert J. Christenson has been transferred from General Telephone Co. of Pennsylvania to the staff of General Telephone Service Corp. as senior methods analyst. Mr. Christenson will report to G. Robert Howard, assistant controller.

Prior to his promotion, Mr. Christenson was assistant controller at General of Pennsylvania, having joined the General Telephone organization in November, 1946, after service in the United States Army Signal Corps.

Previous assignments with General Telephone Co. of Pennsylvania included supervision of the revenue accounting section.

Mr. Christenson received his Bachelor of Science degree in accounting from Gannon College, Erie.

V V

American Lumber & Treating Co. Purchased by Koppers, Inc.

Koppers Co., Inc. on May 1 announced that it has purchased substantially all stock of the American Lumber & Treating Co. (AL&T).

Koppers purchase of the company will be consummated by the exchange of shares of Koppers common stock for shares of American Lumber & Treating stock, Gen. Brehon Somervell, chairman and president of Koppers, said. AL&T has 361,767 issued and outstanding shares of stock.

Plants of AL&T, all of which utilize the pressure-treatment method of preserving wood with creosote or special salts, are located at Everett, Wash.; Wauna, Ore.; Wilmington, Cal.; Crossett, Ark.; Fordyce, Ark.; Shreveport, La.; Port Newark, N. J.; Baltimore, Md.; Florence, S. C., and Gainesville, Fla.

Walter P. Arnold, vice president and general manager of Koppers wood treating operations said that no immediate changes are contemplated in the production or organization of the plants of American Lumber & Treating but that the AL&T headquarters organization, which had been in Chicago, will be integrated with the headquarters organization of Koppers wood preserving division in Pittsburgh.

AL&T has been principally owned by the Aluminum Co. of America and Chicago Bridge & Iron Co., each of which has held in excess of 47 per cent of the outstanding common stock. The other 6 per cent has been owned by various individuals.

A number of patents and trademarks relating to wood treatment are being acquired including the "Wolman" and "Minalith" trademarks which are well known in the wood preserving industry. "Wolman" salts are used as preservative for wood and "Minalith" chiefly as fire retardant treatment for wood. The present policy in regard to licensing the use of these materials to other companies is to continue.

Plants and offices of AL&T employ about 450 persons. First formed in 1923 as American Wood Impregnating Co., predominantly a sales organization, the company was reorganized in 1934 as the American Lumber & Treating Co. Since then, it has expanded in production fields and added new lines of treatment.

V V

Automatic Appoints W. S. Gage Manager of Supply Sales

Announcement has been made by Automatic Electric Sales Corp. of the appointment of William S. Gage as manager, supply sales, effective May 1. Mr. Gage, who has been assistant

W. S. GAGE

manager, carrier and radio sales, for the past 18 months, succeeds D. H. Deaver who now becomes assistant to H. F. Lello, president of the sales company.

Mr. Gage, who joined the Automatic Electric group in July, 1948, graduated from Northwestern University in that year with a B.S. degree, after studies in various technical fields. He followed this with post graduate work at Northwestern in accounting and business administration. Prior to his work at Northwestern, he spent three years in the U. S. Air Force serving in the European theatre as radio operator and member of an aerial combat crew.

Mr. Gage's first assignment with Automatic Electric was as assistant to

the commercial manager in which position he was concerned with various duties of an administrative nature and with commercial policy matters. In February, 1951, he was appointed supervisor of the pricing division, with complete responsibility for the administration of that department. In September, 1952, as a result of Automatic's greatly expanded activities in the engineering and sale of carrier systems, Mr. Gage joined the sales company as assistant manager, carrier and radio sales, with responsibility for the administrative affairs of that group.

D. H. DEAVER

V V

Graybar Names Manager At Wichita, Kan.

J. L. Bevers has been appointed manager of the Wichita, Kan., branch of the Graybar Electric Co., midwestern district manager W. Frazier recently announced. He replaces E. F. Linnerson, who has been transferred to Kansas City.

Mr. Bevers joined the company in 1940 as a salesman at Wichita, transferring to Kansas City in 1945. In 1949 he became manager, outside construction sales, at Kansas City.

A native of Wellington, Tex., he attended Wichita Business College.

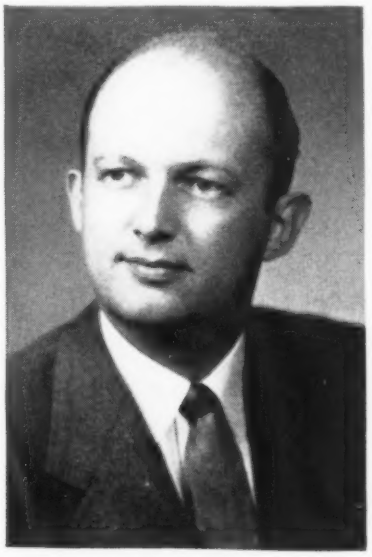
PURPOSE

"The only worthy end of all learning, of all science, of all life, in fact, is that human beings should love one another better. Culture merely for culture's sake can never be anything but a sapless root, capable of producing at best a shriveled branch."—JOHN WALTER CROSS.

Stromberg Missouri Territory Assigned to R. J. Cushing

Roegner J. Cushing and Clarence O. Kastner, Stromberg-Carlson telephone representatives, have exchanged positions, according to T. C. Thompson, sales manager, and A. B. Preble, manager of the Kansas City branch.

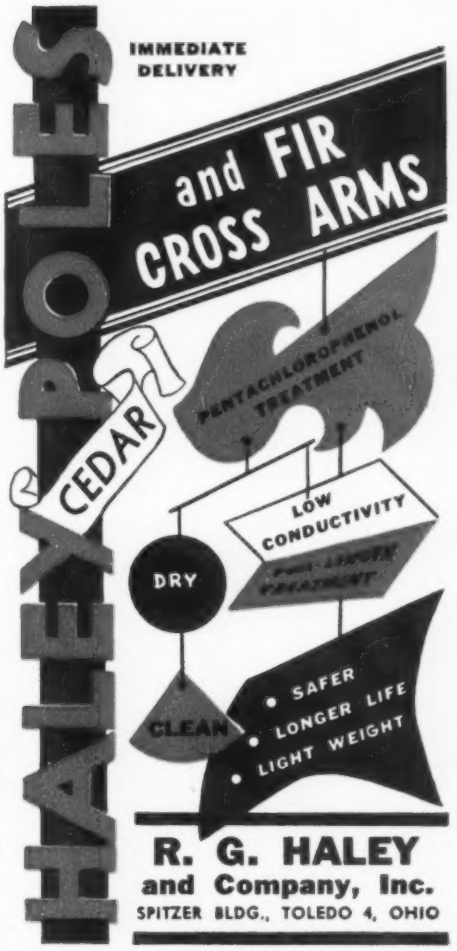
Mr. Kastner, until recently sales representative for Missouri, becomes office manager of the Kansas City branch and Mr. Cushing, who has held this post, moves into the field as telephone sales representative for Missouri. Mr. Kastner, whose recent illness prevents an undue amount of travel, will continue to serve his friends from his new position as office manager, and Mr. Cushing, in taking over the Missouri territory assignment, already is acquainted with many of the Independent telephone managers in his area.



R. J. CUSHING

C. O. KASTNER

Mr. Kastner began service with Stromberg-Carlson in 1936. After two years in the Kansas City office, he be-



TYPE S-1
SUBSCRIBER CARRIER
Deliveries now being made!
Here is a preview of a message with photographs we're preparing for May 29 issue:
One month trial—no obligation!
One year guarantee—all components!
Price per carrier channel $790.
Separate power supply with combination signalling and termination $390.
We hope you will read our complete story in a few weeks.
McELROY
MANUFACTURING CORP.
Littleton, Massachusetts, U.S.A.

NATCO
CLAY CONDUIT

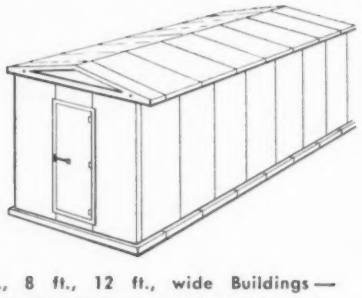
The proved and standard protection for Underground Telephone Cables. Highest quality and full line of shapes.

NATCO CORPORATION
formerly National Fireproofing Corp.
327 Fifth Avenue, Pittsburgh 22, Pa.

PERMACRETE
Sectional Concrete BUILDINGS

● Radio ● Microwave ● Telephone
● Signals ● Storage

2 ft. wide module Roofs, Floors, Walls



6 ft., 8 ft., 12 ft., wide Buildings — Lengths in increments of 2 ft. for maintenance free structures for equipment or personnel shelters. Weatherproof and fireproof — shipped knocked down for easy field assembly.

Write for Bulletin CH

PERMACRETE PRODUCTS CORPORATION
COLUMBUS 7, OHIO

Booths Foundations Crossing Slabs

came sales representative for the states of Oklahoma, Arkansas and southern Kansas. In 1945 Mr. Kastner took over the state of Missouri.

Mr. Cushing has been with Stromberg-Carlson since 1941. After college training in both engineering and business management, he was employed first in the cost department and then in production engineering. Transferred to Kansas City, Mr. Cushing accompanied Mr. Kastner on many sales trips in Missouri.

V V

H. J. Finison Named Director of Engineering for Holtzer-Cabot

National Pneumatic Co., Inc., and Holtzer-Cabot Divisions, Boston, Mass., recently announced the appointment of Harvey J. Finison as director of engineering.

Mr. Finison was formerly associated with the Armour Research Foundation,

H. J. FINISON

Chicago, as an executive in research and development. His experience has been in the application and development engineering field.

V V

William Reardon Appointed Esco Sales Engineer

Appointment of William E. H. Reardon as sales engineer was announced by William Haines, president of The Electric Specialty Co., Stamford, Conn., designers and manufacturers of specially-built rotating electrical equipment.

Mr. Reardon will be a part of the sales engineering group working out of the home office in Stamford. His duties will include coordination of customer engineering group efforts with Esco design and development engineering in new applications of special electrical units; also development of new commercial and government accounts.

Previously associated with such organizations as The Kearfott Co.; Star Kimble Electric Co.; Eastern Air Devices, and Diehl Mfg. Co., Mr. Reardon

W. E. H. REARDON

has spent many years in both the engineering and sale of sub-fractional to integral horsepower motors, generators, servos, and related rotating electrical equipment.

Reduce Replacement Costs
in underground cable systems

Transite Ducts minimize duct replacements: Inorganic, non-metallic, cannot rust . . . immune to electrolysis . . . resist soil corrosion . . . withstand all normal soil stresses.

Transite Ducts protect cables from damage: Smooth bore makes cable pulling easy, reduces abrasion. Composition cannot corrode cable sheath . . . is fireproof.

Transite Ducts are easy to install: Lightweight 10 ft. lengths are easy to assemble or disassemble. Save time and labor when installing.

Write for complete information to Johns-Manville, Box 60, New York 16, N. Y.

JM

Johns-Manville
TRANSITE DUCTS
Transite is a Johns-Manville registered trade mark

J. E. ALBERT
Engineering and General Consultant
TELEPHONE COMPANY
FINANCING • PURCHASE • SALE
185 NORTH WABASH AVENUE
CHICAGO 1, ILL.

Installation Specialists
CENTRAL OFFICES
INSTALLED—MODIFIED—ENLARGED
COMMUNI-CATERING
P.O. BOX 6712 CHICAGO 7, ILL.

ROBERT E. FOLEY CONSTRUCTION CORP.
DESIGN—SURVEYS—APPRAISALS—Construction and Maintenance of Overhead and Underground Telephone Plant. Complete supply of poles available for emergency requirements.
48 GRISWOLD STREET
BINGHAMTON, N. Y. TEL. 2-7215

CYRUS G. HILL
ENGINEERS
PLANT — TRAFFIC — COMMERCIAL
VALUATIONS AND ORIGINAL COST
134 S. LA SALLE STREET, CHICAGO 3

CONSULTING ENGINEERING
CONSTRUCTION MAINTENANCE
OPERATION
MICROWAVE TELEPHONE RADIO
Studies • Research • Reports
CHESTER M. ROBBINS
COLORADO SPRINGS, COLO.

SLOAN, COOK & LOWE
CONSULTING ENGINEERS
Appraisals—Original Cost Studies
Plant, Traffic and Commercial Engineering
120 S. La Salle St.
Chicago 3, Ill. Tel.: FRanklin 2-5924

EDWIN T. MAHOOD
627 W. 67th ST. KANSAS CITY 5, MO.
CONSULTING TELEPHONE ENGINEER
TELEPHONE, JACKSON 4452

G. LOUIS WELLER
CONSULTING ENGINEER
1203 Nineteenth Street, Northwest
Washington 6, D. C. STerling 3-1122
Equipment, Plant, Traffic and Management Engineering
Rates Valuations Investigations

INSPECTION SERVICE
Of poles, crossarms, and preservative treatments. Analyses of wood preservatives. Consulting and specification writing. Inspectors stationed throughout U.S.A.
A. W. WILLIAMS INSPECTION CO.
MOBILE, ALABAMA
ESTABLISHED 1921—MEMBER A.C.C.L.

Automatic Appoints P. F. Smith Illinois Sales Representative

Philip F. Smith, formerly of the installation department of Automatic Electric has been appointed Automatic Electric Sales representative for the state of Illinois. He will fill the position left vacant by the recent death of Frank J. Piller.

Mr. Smith first entered the communications field during World War II as a member of the Army Air Corps.

P. F. SMITH

After training at an Army radio school, he served as a radio operator with the 13th Air Force until his discharge in 1946.

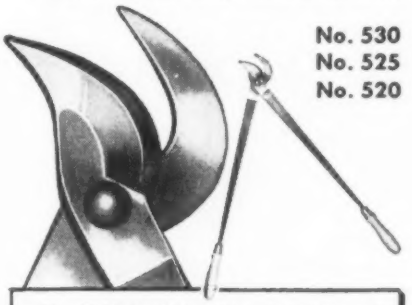
He joined Automatic Electric in 1949, following 2½ years in the installation department of Western Electric. Supplementing his experience with central-office equipment and practices, Mr. Smith has been employed in recent months in Automatic's supply department.

Mr. Smith is a native of Illinois born and reared in Chicago. He is reported to be well acquainted with his sales territory. He was to be in the field on May 1, and will establish headquarters in Galesburg.

V V

"The idea that each person has an inherent and inalienable right to life becomes meaningless when a person loses the authority for his own decisions and must act according to someone else's decisions. Unless a person holds the power of self-control, his life is not truly his own. Before a life can be valued for its own sake—and not just as a means to someone else's goal—that life must have its own power of choosing, its own quality, its own dignity."—LEONARD E. READ, *president, The Foundation for Economic Education, Inc.*

NEW SEYMOUR SMITH TIFFANY PRUNER
Now two great names combine in the world's finest long handled pruner.



No. 530
No. 525
No. 520

The *TIFFANY* double cut, efficient "draw-in" cutting action and 100% hammer forged alloy steel parts **PLUS** the ***Seymour Smith*** improved bolt and nut joint, through handle and riveted grip fastening and thinner cutting edges.

3 SIZES: 30" ($5.75)
25" ($5.50) 20" ($5.25)

"TELEPHONE" TREE PRUNERS
Reinforced malleable iron head. Tempered steel blade. Compression coil spring. Spruce poles with telescoping ferrule joints. Cable chain works through ball bearing pulley. Cuts up to 1".
No. 11-18, Complete pruner with rope and 18' pole.....$16.00
No. 11 (Pruner Head only) $4.20
Prices for No. 12 Head (for 1½" cutting) and extensions on request.

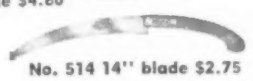
PROFESSIONAL PRUNER

no. 124 8" $3.50 No. 125 9" $4.00

The standard "Double-Cut" pruner for the expert. Also, the finest of them all, No. 90, 8". $4.75.

NEW, FINEST EVER
PRUNING SAWS

No. 922 22" blade $4.60



No. 514 14" blade $2.75

A new Seymour Smith development, with blades of finest Swedish steel. Fastest, easiest cutters on the market. Complete line of 6 models covering all requirements up to chain saw work.

SEYMOUR SMITH
OUR 104th YEAR
The Line of Quality

Prices slightly higher Denver and West

See your dealer — or write for free, descriptive literature.

Seymour Smith & Son, Inc., 42905 Main St., Oakville, Conn.

CLASSIFIED SECTION

Rates 15 cents per word payable in advance. Minimum charge $3.00 for 20 words or less.
Classified advertisements must reach us 8 days before publication date.

FOR SALE

DROP WIRE

#17 Buna-S jacket, Parallel DROP WIRE, two solid tinned copper conductors, excellent for direct burial or duct use.

Per Mft.	$12.95
2500 ft. reels, Mft.	12.75
3 reels or more, Mft.	12.25

W.E. LEAD COVERED CABLE

1000 ft.—16 pr. 24 gauge, F.O.B. Chicago,

Mft.	$225.60
Returnable Reel	8.45

WDITT TELEPHONE FIELD WIRE

Latest style Signal Corps, Thermoplastic jacket, 2-conductor twisted pair (4 copper, 3 steel). Readily spliced with 3-045B Compression Sleeves and insulated against moisture with Bi-Seal Tape. Per Mile $20.00

TELEPHONE REPAIR & SUPPLY COMPANY
1760 Lunt Avenue Chicago 26, Ill.

TELEPHONE EXCHANGE IN SOUTHEASTERN NEBRASKA—300 station magneto telephone exchange, plant rebuilt in 1949, in good condition. Must sell due to clearing of estate. Write Box No. 134, Lawrence, Nebr.

NEW TOOL — UNDER $3.00 — to open drop wire clamps for re-sag or salvage. Write for literature, R. Lieto, 717 Grove Ave., Cliffside Park, N. J.

FOR SALE

REBUILT REFINISHED GUARANTEED

W.E. #5H Dials, new number plates	$4.00
W.E. #202 Desk Handsets. F-1 handle. Complete with cords	$8.50
"REBELCO" Handset conversion kits. F-1 handle, 4 cond. cord, cover plate and saddle	$7.50
NEW W.E. #110 Swbd. Plug, complete with NYLON 4 ft. 3 cond. cord. Red or Gray	$2.50
W.E. Handset handle with F-1 and HA-1 units, complete with cord	$5.00
#706 Receivers. HA-1 unit in slip type shell, cord included	$1.50
#635 Transmitter. F-1 unit in plastic front	$1.65

Factory method rebuilding of your Telephone equipment. Try us. Over forty years of service to the Independent.

REBUILT ELECTRIC EQUIPMENT CO.
1704 WEST 21st PLACE • CHICAGO, ILL.

50-LINE MAGNETO SWITCHBOARD, 50 drops, 10 cord circuits, repeating coils, condensers, double ring off drops, ring back keys, night alarm, emergency hand generator for hand ringing. This board is a 1948 Leich. Priced at $275. Should be available by June 1. Write Peck Mutual Telephone Co., Peck, Kansas.

TELEPHONE PLANTS: 1 magneto, 2 common battery, 1 dial, 1500 telephones. Twelve months revenue $120,000. Write Telephone Company, Box 173, Oak Hill, W. Va.

USED 1½ TON 1951 UTILITY CONSTRUCTION TRUCK with cable, winch and derrick. Dennison Motor Sales, Crandon, Wis.

FOR SALE

IMMEDIATE SHIPMENT

Subject to prior sale, new lead cable, 22 gauge, single wrap Paper Insulation:

10,506 ft.—26 pr.
(1-3506'; 2-3500' reels)
238 ft.—202 pr. on one reel
4,273 ft.—303 pr.
(1-226';1-240'; 3-761'; 2-762' reels)
1,365 ft.—404 pr.
(1-195'; 1-533'; 1-637' reels)
1,326 ft.—606 pr.
(1-221'; 1-510'; 1-595' reels)

WRITE BOX NO. 3483, c/o TELEPHONY

RECONDITIONED
FEDERAL #804A

Magneto Compact set convertible to desk or wall.

Equipped with capsule type transmitter and receiver. Can be used on ong rural lines.

PRICE $19.50 EACH

Terms 2%—10 Days Net: 30

BOHNSACK EQUIPMENT CO.
GERMANTOWN, NEW YORK

FOR SALE

3 Addressograph 171 Drawer Plate Cabinets—Style EE Plate

1 Automatic Feed for Model 1900 Addressograph

1 National Utility Billing Machine

This equipment is in excellent condition. Has been used only sparingly over a 4 year period.

WRITE

MR. FRANK PETER
Controller
General Telephone Company of Indiana, Inc.
Lafayette, Indiana

DIAL PABX SWITCHBOARD

Western Electric #740-C Dial PABX Switchboard, wired for 5 trunks and 40 lines. Equipped with 2 trunks and 38 lines. Wired for 7 connectors (connecting circuits) equipped with 4. Complete with power equipment, ringing equipment and 2 attendants key cabinets. Less batteries. Approximately 6 years old and in good condition.

Federal #25-C Dial PABX Switchboard, wired and equipped with 5 trunks and 25 lines. Complete with attendants key cabinet and battery eliminator. Practically new condition.

EMERGENCY POWER SUPPLIES

Homelite Model 25A208/120/3/60-9A gasoline motor generator set with 4.5 KW 208/120 3 phase 60 cycle output. Portable and has 48 volt D.C. starter terminals or can be started manually. Auxiliary gas tanks. One unit complete with outdoor housing.

BUCKEYE TELEPHONE & SUPPLY COMPANY
1250 KINNEAR ROAD COLUMBUS 21, OHIO
KIngswood 0655

THIMBLE EYE BOLTS
DROP FORGED, GALVANIZED
J-8051—⅝" x 10" Straight
J-8151—⅝" x 10" Angle
$40.00 per hundred
WILLIAM CERESKE CO.
461 MARKET ST., SAN FRANCISCO, CAL.